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Steel Wins Long Battle for Stability

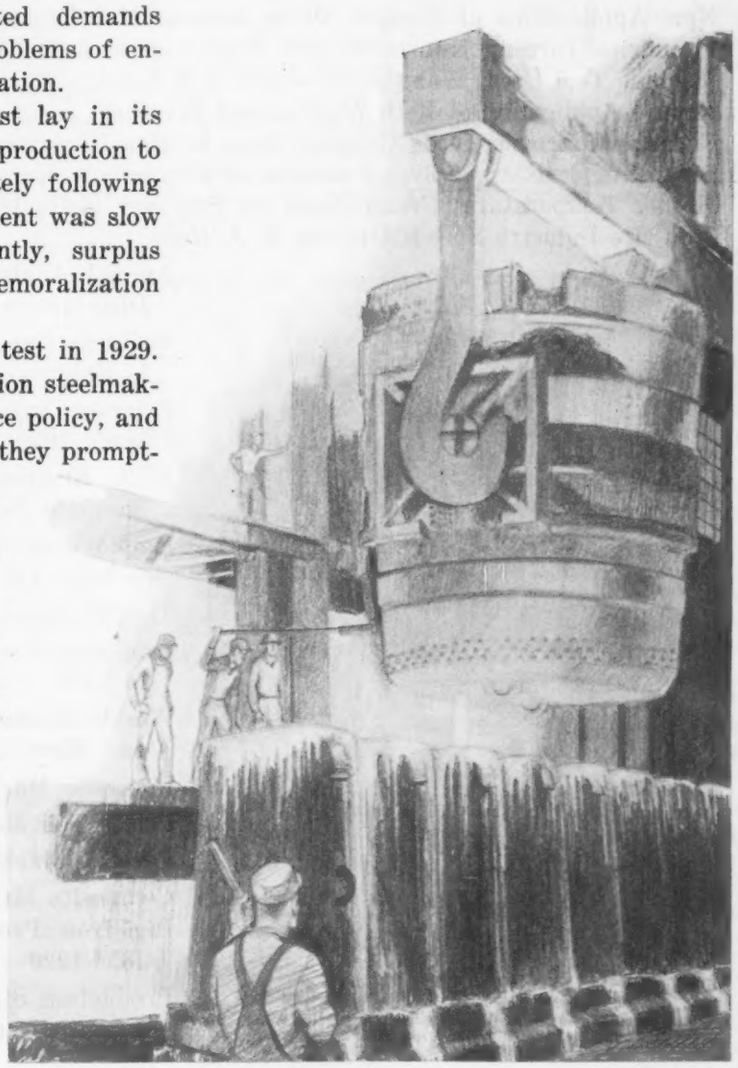
By E. L. Shaner
Editor, Iron Trade Review

DURING the past ten years steel has tasted almost every form of business experience. It has survived depressions of extreme severity, successfully met unprecedented demands for tonnage, and solved many problems of engineering, finance and administration.

Its major difficulty in the past lay in its apparent inability to co-ordinate production to consumption in periods immediately following prosperity. Invariably management was slow to curtail operations; consequently, surplus stocks accumulated and price demoralization appeared.

The industry again faced this test in 1929. During months of record production steelmakers adhered to a conservative price policy, and when the crash came in October, they promptly trimmed supply to fit demand, thus sparing themselves the embarrassment of surplus material and attendant evils. By this action steel for the first time proved its ability to "stand prosperity."

This is a great victory. It shows what can be done when intelligent leadership and efficient management stand united against destructive elements. It reflects an attitude of mind which should insure stability in the future. On the strength of this accomplishment steel can face the new decade with a degree of confidence enjoyed by few of America's basic industries.



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Finance Gives Steel Market Vision

Triple Alliance with Research and Production Capitalizes Progress—Patent Rights Loom Large

By E. C. Barringer
Associate Editor, Iron Trade Review

FROM a vantage point unobstructed by the routine of the industry, finance has glimpsed the potentialities of iron and steel. To the advances registered by the technical and operating departments of the industry it is now lending the support of its best thought on merchandising.

It has visioned the benefits of an improved financial setup, the economies of mergers, the advantages of integrating producers and correlating them with consumers, the possibilities in more intensive research and the markets opened by new products.

The stimulus of financial management has greatly quickened the United States Steel Corp. in the past year. The Eaton interests at Cleveland have made the Republic Iron & Steel Co. the nucleus of a great independent group. Many other combinations effected in the past year have brought improved positions. As far back as lake shipping the movement has been felt.

Nineteen twenty-nine saw much of the groundwork of the new era of financial management laid. Nineteen thirty should receive further impulse. And the consumer of iron and steel, meanwhile, is being provided better material, more promptly, at less cost.

FINANCE is bringing a new leadership to steel. Long a partner in the industry, it remained silent while technical and operating staffs were scoring important advances. Now, at a seemingly propitious moment, when experimental work has culminated and steel has the most in years to offer in products and in service, finance has been quick to grasp the situation. It has actively interested itself in management and is supplementing the potentialities of the mills with a vision of merchandising. Already the entire iron and steel industry is experiencing a quickening. Competition is being recast and there are indications that in 1930 it will be more rational, albeit assuming new lines and intensity. There is scarcely a large producer that is not attempting to strengthen its position, adding new products or acquiring production at strategic shipping points.

Leading independent producers are in process of being integrated, and some are being correlated with consumers. Research, already broadening, has received a major impulse from the widespread recognition of patent rights. Funds for plant extensions and betterments are being budgeted, in instances as far ahead as three years. Larger sums have been appropriated for advertising and publicity. Consumer requirements are being forecast. Finance is indeed inspiring steel with a new management, believed by some to be the most intelligent in several decades.

Corporate ownership of the iron and steel industry, which finance is now firing with new vigor, arrived with the formation of the United States Steel Corp. 29 years ago. It was heir to the steelmaster age, when ownership and management of iron and steel properties were practically synonymous. Coincident with corporate ownership came wide public participation in the industry, and inevitably a diffusion of control. By sufferance control, or management, passed to a minority. For about two score years, or until after the World war, the goal of management largely was volume—and still more volume. The industry was satisfied to supply consumers with their requirements and finance, still silent, was content with the profits. But when the war and the production spree and sobering of 1920 and 1921 were over, a new era dawned in all industry. In steel the entire aspect changed. Markets that appeared secure for all time were threatened by new products. The mechanization of industry put steel to new uses. Greater strength with less weight at a lower price, was the mandate!

The automotive industry—young, restless, exacting—pushed its way to the forefront and in 1928 supplanted the railroads as the premier consumer of finished steel. Its call for improved alloy steels was insistent. Public utilities, foreseeing pipe line projects of record magnitude, wanted better pipe. The Germans in their laboratories were developing corrosion and heat resistant steels revolutionary in character.

Meanwhile, the country's accumulation of capital was expanding at an extraordinary rate. Money was seeking an opportunity to work. And, fortunately for the iron and steel industry, in the ranks of finance arose men, charged with the prudent investment of large aggregations of capital, who visualized the possibilities

of capitalizing and furthering the progress of the technical and production departments of the industry. They did not represent a majority of stock holdings in many cases, but sufficient to make their voice dominant.

So, in recent months, there has been a happy union of science, production and finance, whose benefits are only now beginning to be realized. It is not that the production side of the industry has become subordinate to merchandising; rather, production was in need of a mode of expression. It is the sales or market consciousness that finance has brought to the industry that has rounded out the picture; the one has complemented the other. From its vantage point, unobstructed by the routine of production, finance has seen the promised land, and acted. Who would have been rash enough to predict, so late as two years ago, that the Steel corporation, impregnable as the dominant force of the industry, representing 40 per cent of the country's steelmaking capacity, by its own size and dignity surrounded by many inhibitions, would:

Take out licenses from the Bethlehem Steel Corp. and the American Rolling Mill Co. for rolling steel products under their patents.

Overturn a 22-year precedent by purchasing a going concern and entering production on the Pacific coast.

Plan carbon bar capacity at Cleveland, enabling it to make direct water shipments to the lucrative automotive market of the Great Lakes, with possible extension of its marine service to supply North Atlantic ports from the Great Lakes.

Improve its financial setup by retiring some $340,000,000 in bonds of subsidiaries and increasing both the amount of common stock and the dividend.

Instill a "corporation consciousness," capitalizing instead of minimizing the corporation affiliation of the various subsidiaries.

Who could have foretold how carefully the segments of the Republic merger, now in process of consummation, would fit together; how the Republic, Central Alloy, Union Drawn, Interstate, Steel & Tubes, Donner, Trumbull and Fritz-Moon properties would complement each other, bring to the union outlets for each other's products and fortify the whole with the possession of exceedingly valuable patent rights?

Who would have forecast that a continuous sheet mill being developed by the American Rolling Mill Co. at Ashland, Ky., would have caused the iron and steel industry completely to reverse its stand on patents and would elicit license applications from the Steel corporation, Youngstown Sheet & Tube Co., Republic Iron & Steel Co., Wheeling Steel Corp., Weirton Steel Co., Gulf States Steel Co. and Otis Steel Co?

MYRON C. TAYLOR, who brought bank control to the United States Steel Corp.

In two distinct phases has finance penetrated the management of the iron and steel industry in the past year. One is typified by the new policies brought to the Steel corporation by Myron C. Taylor, who became chairman of the corporation's finance committee late in 1927 following the death of Judge Gary. Mr. Taylor's previous major identifications were with banks, having large holdings in the corporation, and with textile interests.

The other is exemplified by the investment trusts, of which Continental Shares Inc., of Cleveland, prime mover in the recent Republic merger, is outstanding. Investment trusts, it should be noted in passing, are of two kinds.

One is engaged wholly in purchasing securities for a profit, at no point touching management. The other acquires an interest in an industry for the profit that may accrue from the introduction of better management and a correlation with other industries. Of the latter type is Continental Shares, of which Cyrus S. Eaton, investment banker, is chairman and W. R. Burwell is president.

Of the 60,000,000 tons of annual ingot capacity in the United States, the Steel corporation accounts for 24,500,000 tons and the Republic merger, as now constituted, for 4,900,000 tons. Continental Shares is actively interested in other steel producers having an approximately annual capacity of 6,000,000 tons. Thus, it may be said that over 35,000,000 tons, or 60 per cent of the steel plant of the country, is influenced directly by these two financial factors. And the rest of the industry of necessity is sensitive to the new policies. Fiction has no romance greater and logic no reasoning more orderly than the renaissance of the Republic Iron & Steel Co. under the guidance of Continental Shares. Here is the premier example of finance, foreign to steel practice, working to a definite pattern and doing for unrelated steel groups what they could not do for themselves. Republic, a time-honored name in the iron and steel industry, was enabled first to acquire the Trumbull Steel Co., providing an outlet for semifinished material and bringing to the union a modern strip mill.

As a result of the recent purchase of Steel & Tubes Inc. and a half-interest in the Fritz-Moon Tube Co., Republic came into possession of valuable patent rights relating to the electric welding of conduit and pipe of all sizes.

When Union Drawn Steel Co. was taken over a market for a large proportion of Republic's carbon bar capacity was assured. Meanwhile, Donner Steel Co., maker of alloy steels, with a plant strategically located on

the Great Lakes at Buffalo, came under the control of Continental Shares. Donner immediately absorbed the Witherow Steel Corp., Pittsburgh, having not only a lucrative automotive forging business requiring large tonnages of alloy steel but also possessing important die rolling patents.

Central Alloy Steel Corp., largest alloy steelmaker and active in the new corrosion types, in which Continental Shares also had a large interest, was acquiring the Interstate Iron & Steel Co. properties at Chicago, another Great Lakes alloy steelmaker. At Cleveland was the Bourne-Fuller Co., in which Continental Shares and Commonwealth Securities were the largest stockholders, also a maker of alloy steel and a tradition in the bolt and nut trade. Large investments in the Cliffs Corp., holding company for the Cleveland-Cliffs Iron Co., give the Eaton group large iron ore and lake vessel resources. Thus in December, when the aforementioned companies were merged, was completed the initial step of rounding out Republic as one of the largest independent steel enterprises of the country. It is easy to visualize how the Eaton interests and their affiliated investment trusts, with vast sums at their disposal, were able to put in their proper place the various segments of this production problem. Nor is the process complete. The Interstate properties at Chicago do not afford the basic iron and steel production required in that district and it is possible that the Inland Steel Co., in which the Eaton interests have stock holdings, will some day fill this void. The rising importance of water shipments to the attractive and growing markets of the South and the Southwest make production on the Ohio river, or in the Pittsburgh and Wheeling districts, highly desirable. Into this picture the Wheeling Steel Corp. would fit and it may eventually be found there.

But the integration of the Republic Steel Co., as the merged properties probably will be designated, is only one step in Republic's rebirth. Its correlation with other interests, notably public utilties, in which the Eaton group has large stockholdings is of paramount importance. Other things being equal, the steel pipe requirements of the Eaton utilities—and they are large—will be diverted to Republic's mills. Already relations of years' standing of some of these Eaton utilities with other pipemakers have been severed.

In turn, this is greatly intensifying the competitive situation in pipe. Several years ago, after lap and buttweld steel pipe had long held undisputed sway, the A. O. Smith Corp. of Milwaukee, developed an electric welding process which at once made available a superior product at a reduced price. The diversion to it in 1929 of some of the most lucrative business to come before the pipe industry in years was a consequence of this situation.

CYRUS S. EATON, whose investment trust is merging independent steelmakers

The reanimated management of competing companies long antedating the Smith corporation proceeded to checkmate. When the Republic company purchased Steel & Tubes and the Fritz-Moon Tube Co. it acquired patent rights to another form of electric welding of pipe, and these patents are regarded as probably the most valuable single asset of the merged Republic group. Among some other pipemakers there was a turning toward the German seamless process.

The Steel corporation, as one phase of the rehabilitation of National Tube Co. under the aegis of Mr. Taylor, may shortly have a seamless steel pipe or tube to offer at a price competitive with the welded product. And the A. M. Byers Co. in a few months will be in production of wrought iron, mechanically, at its Ambridge, Pa., plant and will heighten competition in the smaller sizes. The steel pipe industry in the past year to year and a half has almost completely revolutionized itself, thereby making possible the largest and longest gas and oil lines in history. Through research and management it has opened a vista of sales possibilities which orthodox lap and buttweld pipe could never have penetrated. When Republic acquired the Union Drawn company it automatically deprived the Steel corporation of one of the largest carbon bar accounts of the country. It is entirely logical, therefore, in this new era of management and competition that the Steel corporation should be planning carbon bar production at Cleveland, undoubtedly to include cold drawing. This capacity at Cleveland may be developed either through the purchase of a Cleveland independent steelmaker or through enlargement of the Newburg works of the American Steel & Wire Co., provision for which already is in the company's budget. At Cleveland the Steel corporation would be in position to make water shipments to the attractive automotive markets of Detroit and Toledo. It is also reported, though lacking official confirmation, that 1930 will see a fleet of ocean-lake steamers passing through the enlarged Welland canal delivering finished steel products of the Steel corporation from Cleveland, Conneaut and other important lake ports to the various North Atlantic markets.

Inclusion of the Central Alloy properties in the Republic group undoubtedly will relocate alloy steel business of considerable magnitude. Every steel-consuming company in which the Eaton group has a financial interest is a potential purchaser of Republic steel. And in turn competin steelmakers are seeking to broad-

en their sales outlook. The Steel corporation, for example, is experimenting with the new anticorrosion steels at the new Illinois Steel Co. alloy steel mill at South Chicago, although it is not now a seller of these steels. Not all of the policies adopted by the Steel corporation since the advent of Mr. Taylor as chairman of the finance committee are original to him. Many have long been slumbering in the minds of corporation officials, awaiting a sympathetic hearing. But the initiative revived, the enterprise evoked, the strides made by this billion dollar steel corporation since a banker and a textile executive took the helm are most remarkable. A thorough inspection tour of practically every Steel corporation property by Mr. Taylor and James A. Farrell, president, preceded the program. Then came a budgeting of improvements and extensions, on a three-year basis. A real research laboratory was set up and various plant laboratories enlarged, until today the Steel corporation has 115 laboratories employing about 2000 research men.

W. R. BURWELL, mathematician who left a university to become president of Continental Shares Inc.

It was decreed that the National Tube Co. be rehabilitated. A wide-flange structural mill was ordered for the Homestead works of the Carnegie Steel Co. Breaking away from a precedent that the Steel corporation should not enlarge by purchase, the Columbia Steel Corp. properties on the Pacific coast were acquired. It was decided to get into bar production at Cleveland. A real entry was made in the alloy steel markets.

Fewer Bonds, Larger Dividends

The financial instincts of Mr. Taylor asserted themselves and about $340,000,000 in bonds of subsidiaries was retired and a program initiated of retiring all bonds, although the reversal of the stock market last October-November may delay consummation. Redemption of bonds made available in 1929 approximately $2.45 additional per common share although 1,009,485 new shares were issued, bringing the common stock issued to a total of 8,125,720 shares.

But ranking all phases of management introduced by the Taylor regime is recognition of the patent situation. In the past year Corporation subsidiaries have been licensed under the continuous flat steel rolling process of the American Rolling Mill Co. and under the Grey mill patents of the Bethlehem Steel Corp. Nothing so revolutionary has occurred since the founding of the corporation. From this modernistic attitude toward patents the steel industry, for which the Steel corporation undoubtedly has set the pace, emulating the electrical and the radio industries, is expected to flow new stability and still further technical progress. The traditional result of licensing under patents is stabilization of prices among licensees. Whatever the license cost per ton or other unit may be, invariably it is less than open-market fluctuations where competition is unrestrained. Assured that they will reap the benefits of research, steel producers can now go forward in their development work with a new sense of security. The Steel corporation may be large enough at least seriously to challenge patent rights, but its respect for them points the way and insures like consideration from every factor in the industry. Look back into the tremendous strides made in new products and in merchandising by the steel industry in 1929. The surge given to the wide-flange structural beam, the continuous rolling of strip steel and sheets in greater widths and higher finishes, introduction and application of corrosion and heat resistant alloys, continuous tinplating of strip—all involve patents.

Continental's Stake in Steel $47,000,000

CONTINENTAL SHARES INC., of Cleveland, which played the leading role in the recent independent steel merger centering on the Republic Iron & Steel Co., states that one of its purposes is "promoting more effective operation and more efficient management by means of co-operation among, or mergers or reorganization of, companies." Its portfolio as of Nov. 30, 1929, included the following steel and allied stocks, having a market value as of that date of $47,032,032 compared with total holdings in all industrials and utilities of $130,000,302:

Company	Number of Shares	Market Value
Central Alloy Steel Corp.	46,700	$1,570,287
Donner Steel Co.	250,000	8,750,000
Do, preferred	15,000	1,500,000
Youngstown Sheet & Tube Co.	8,000	848,000
Inland Steel Co.	1,000	74,875
Bourne-Fuller Co.	25,197	1,637,805
Wheeling Steel Corp.	3,243	275,665
Cliffs Corp., common	245,142	29,417,000
Do, voting trust cert.	2,000	240,000
Interlake Steamship Co.	4,800	398,400
Harbison-Walker Refractories Co.	40,000	2,320,000

Other Makers Are Expanding

Neither the Steel corporation nor the Republic-Eaton steel group, however, has a monopoly on the impulse emanating from the new spirit of management and enterprise. The Youngstown Sheet & Tube Co., by reaching out for the Acme Steel Co., large producer of strip steel at Chicago, is attempting to fortify its position. The Wheeling Steel Corp. is purchasing Tyler Tube & Pipe Co.

The Bethlehem Steel Corp., immediately after the United States Steel Corp. acquired production facilities on the west coast, countered with the purchase of the Pacific Coast Steel Co. and the Southern California Iron & Steel Co. With the Republic group threatening to become the largest independent producer in the Middle West, where Bethlehem has no production nearer than its Lackawanna

(Concluded on Page 13)

HERE TODAY, GONE TOMORROW

Elusive Markets Lead Steelmakers *IN MERRY CHASE*

By G. H. Manlove and W. H. Lloyd

Associate Editors, IRON TRADE REVIEW

MUCH has been said and written of the rapid shifting of commodity markets. Authors of the report on "Recent Economic Changes" stated that the great capacity of the public to absorb changes quickly is one of the outstanding characteristics of the present period. Numerous authorities agree that commodities become antiquated more rapidly now than ever before and that an article demanded in millions today may be begging a market tomorrow.

The truth of these assertions is found in the distribution figures of practically every manufactured material and product. The evidence in the steel industry is especially significant, because sudden shifts in the consumption of steel products necessitate expensive adjustments in production equipment. On more than one occasion furnaces and mills representing an outlay of more than $10,000,000 have been made practically obsolete through unexpected changes in the products required for certain work.

As shown on Pages 36-39 of this issue in the distribution analysis of finished steel, over half of the tonnage of rolled steel is consumed in the automotive, railroad, building and oil, water and gas industries. It would appear, therefore, that the greatest opportunities for changes affecting important tonnage lie in these markets.

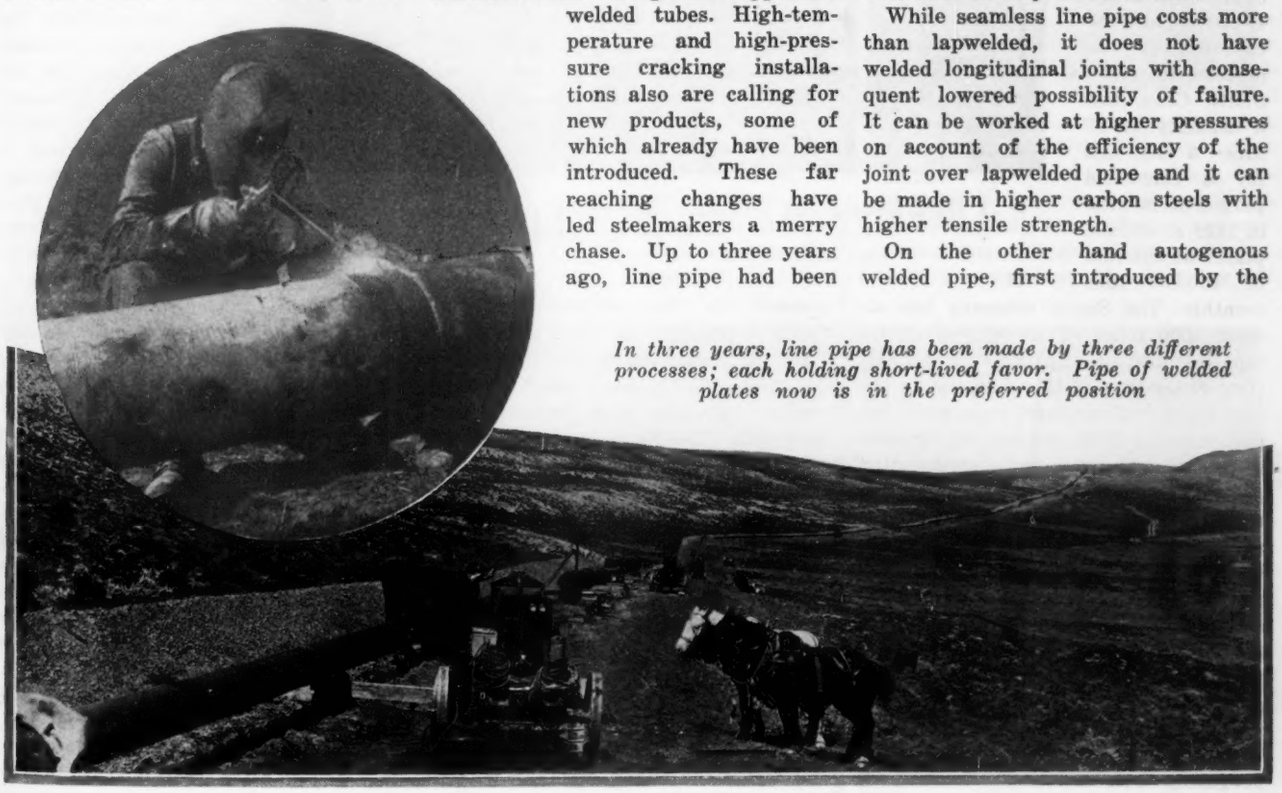
Oil Industry Demand Shifts

IN RECENT years the petroleum industry has been steel's most elusive market. Almost overnight it discarded lapweld line pipe in favor of seamless and then with equal abruptness threw its preference to thin-walled electric welded pipe. For deep well drilling seamless steel tubing has supplanted welded tubes. High-temperature and high-pressure cracking installations also are calling for new products, some of which already have been introduced. These far reaching changes have led steelmakers a merry chase. Up to three years ago, line pipe had been manufactured according to practice that had remained unchanged for many decades.

Lapwelded line pipe had a tensile strength of 48,000 pounds per square inch and necessarily was of low carbon steel. For joining its lengths screwed couplings were used. About two years ago seamless pipe with 48,000-pound tensile strength was adopted widely, the ends being welded together with oxyacetylene gas. Later the tensile strength was increased to 64,000 pounds. Within the past year or two the so-called autogenous electric welded pipe has gained favor for trunk lines 12-inch and larger. This is lighter in weight than either lapwelded or seamless material, is made of 0.25 to 0.35 per cent carbon steel and has a tensile strength of from 64,000 to 72,000 pounds, with a wall thickness of only about ¼-inch.

While seamless line pipe costs more than lapwelded, it does not have welded longitudinal joints with consequent lowered possibility of failure. It can be worked at higher pressures on account of the efficiency of the joint over lapwelded pipe and it can be made in higher carbon steels with higher tensile strength.

On the other hand autogenous welded pipe, first introduced by the

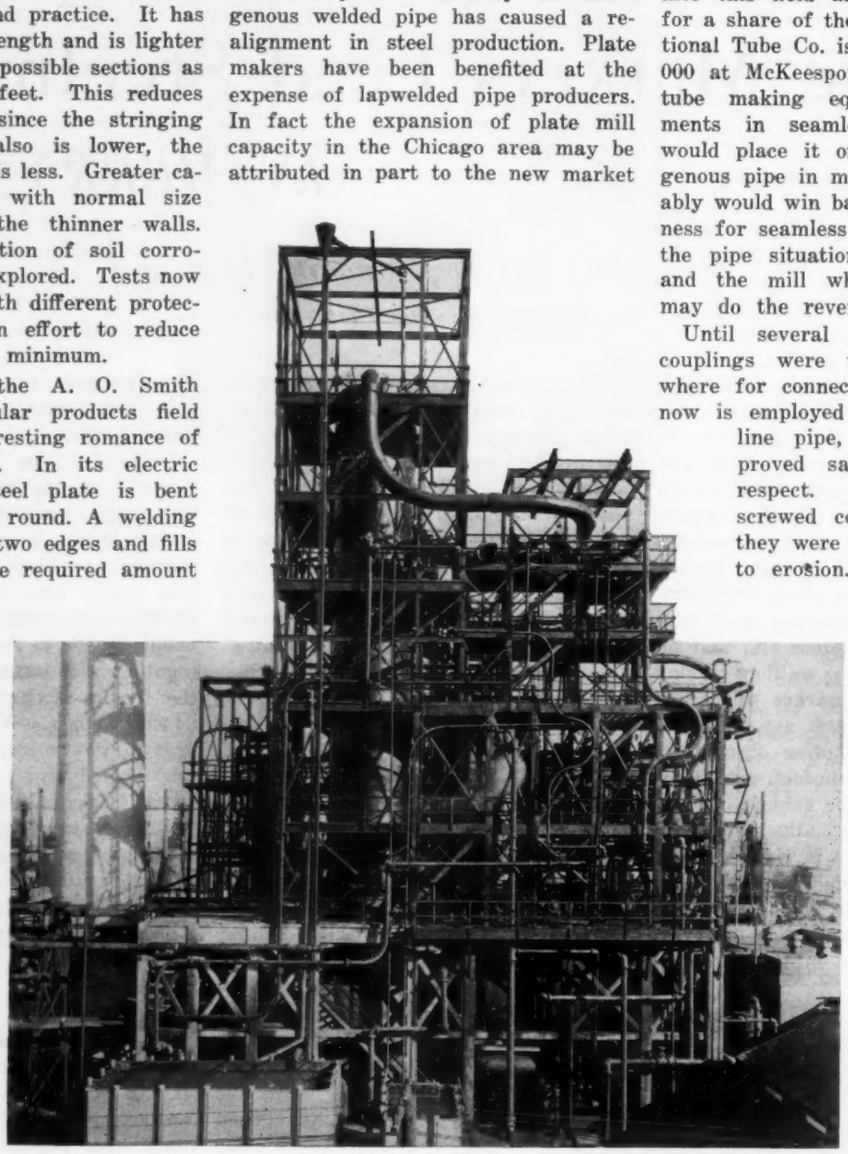


In three years, line pipe has been made by three different processes; each holding short-lived favor. Pipe of welded plates now is in the preferred position

A. O. Smith Corp., Milwaukee, gained preference over seamless because of its economy. Welds both longitudinal and circumferential have been found reliable in tests and practice. It has a higher tensile strength and is lighter in weight, making possible sections as long as 40 to 45 feet. This reduces freight costs and since the stringing and laying cost also is lower, the overall investment is less. Greater capacity is possible with normal size pipe because of the thinner walls. However, the question of soil corrosion still is being explored. Tests now are being made with different protective coatings in an effort to reduce this hazard to the minimum.

Ascendency of the A. O. Smith Corp. in the tubular products field constitutes an interesting romance of the steel industry. In its electric welding process steel plate is bent cold almost to the round. A welding machine heats the two edges and fills in the gap with the required amount of molten metal. Prior to its advent into this branch of the industry about two years ago, seven mills in the country made pipe 20 inches and larger. No one of these seven could make more than a mile a day, giving an aggregate output of 7 miles daily. Because of the rapidity of its process, the A. O. Smith Corp. has a capacity of 26 miles a day, and for a continued period of months in 1929 it utilized plates at the rate of 100,000 tons monthly. The Smith company has almost 4000 miles of its large-diameter pipe installed or in process of installation. Shipments of this material in the first quarter of its fiscal year, which began Aug. 1, 1929, showed an increase of 324 per cent over the corresponding period of the preceding year. It was awarded 191,000 tons, the largest single order ever placed for line pipe, by Central States Natural Gas Corp. for a line from Texas to Chicago. It also shared in the 100,000-ton gas line of the Southern Natural Gas Corp. from Louisiana to Birmingham, Ala., and was awarded 325 miles of the 554-mile line of 22-inch for the gas line from Monroe, La., to St. Louis, aggregating 145,000 tons. Recently it booked 63,000 tons of 26-inch pipe, the largest in diameter it has attempted to make by this process.

Naturally this activity in autogenous welded pipe has caused a realignment in steel production. Plate makers have been benefited at the expense of lapwelded pipe producers. In fact the expansion of plate mill capacity in the Chicago area may be attributed in part to the new market created by the activities of the Smith interests.



High temperatures and pressures are calling for special steels in petroleum refining equipment

In the meantime pipe interests in the steel industry have taken steps to retrieve the line pipe business they have lost. The Republic Steel Co. has completed equipment for making 4 to 6⅝-inch pipe by the autogenous welding method and within a short time will furnish 12, 14 and 16-inch material. It hopes to be producing up to 24-inch pipe by April next. The Republic company prepares the plates for electric welding by successive passes through forming machines. These gradually bend the plate into a cylinder, with the edges touching. A welding head passes over the joint and welds the edges together without introducing additional welding metal.

Youngstown Sheet & Tube Co. is understood to be preparing for entry into this field and in 1930 will bid for a share of the business. The National Tube Co. is expending $20,000,000 at McKeesport, Pa. for seamless tube making equipment. Improvements in seamless practice which would place it on a par with autogenous pipe in matter of price, probably would win back part of the business for seamless mills. At any rate the pipe situation still is undecided and the mill which prospers today may do the reverse tomorrow.

Until several years ago screwed couplings were used almost everywhere for connecting pipe. Welding now is employed to join lengths of line pipe, and thus far has proved satisfactory in every respect. One objection to screwed connections was that they were the first to succumb to erosion. Leakage has been largely eliminated by the use of welded joints. One eminent oil and gas line authority declares that screwed couplings are practically obsolete, except in gathering lines. Thus in the span of a few years, one of the most important consuming markets for large threaded couplings has almost disappeared. A similar change has occurred in the consumption of drilling pipe. With the advent of rotary drilling, the previously used welded pipe and tubing would not serve when depths reached 3000 to 7000 feet. Bessemer steel welded tubes had a tensile strength of about 52,000 to 62,000 pounds per square inch. Open-hearth welded tubes averaged 50,000 to 60,000 pounds. Strength could not be increased materially since only low carbon steel can be successfully welded into pipe. To obtain increased strength in welded pipe, the wall thickness had to be increased and this brought a commensurate decrease in the amount of clearance between sizes when telescoped into the well. The answer was seamless tubing. It is claimed to stand greater punishment, to wear less rapidly and to offer greater resistance to

collapse. Higher carbon steels can be utilized in its manufacture and thus extra strength without increased wall thickness is secured.

Changes in methods of refining petroleum are affecting the consumption of steel. High pressures and temperatures in stills are encouraging the use of chromium-nickel steels. Plates of the 18 per cent chromium, 8 per cent nickel analysis cost from $15 to $20 per ton more than ordinary carbon plates. Much of the extra cost, however, is due to the extra care exercised in the production of the steel. The steel is highly refined, is silicon cooled and is heavily cropped. The steel is closely inspected at many stages before and after it leaves the steel mill. Often the inspector or engineer of tests from the oil company is sent to the mill where the steel is made to give it thorough inspection and tests for all possible defects before the steel is shipped to the fabricator. These plates usually are 2½ to 4 inches thick. Where greater thickness is required steel forgings instead of plates are utilized.

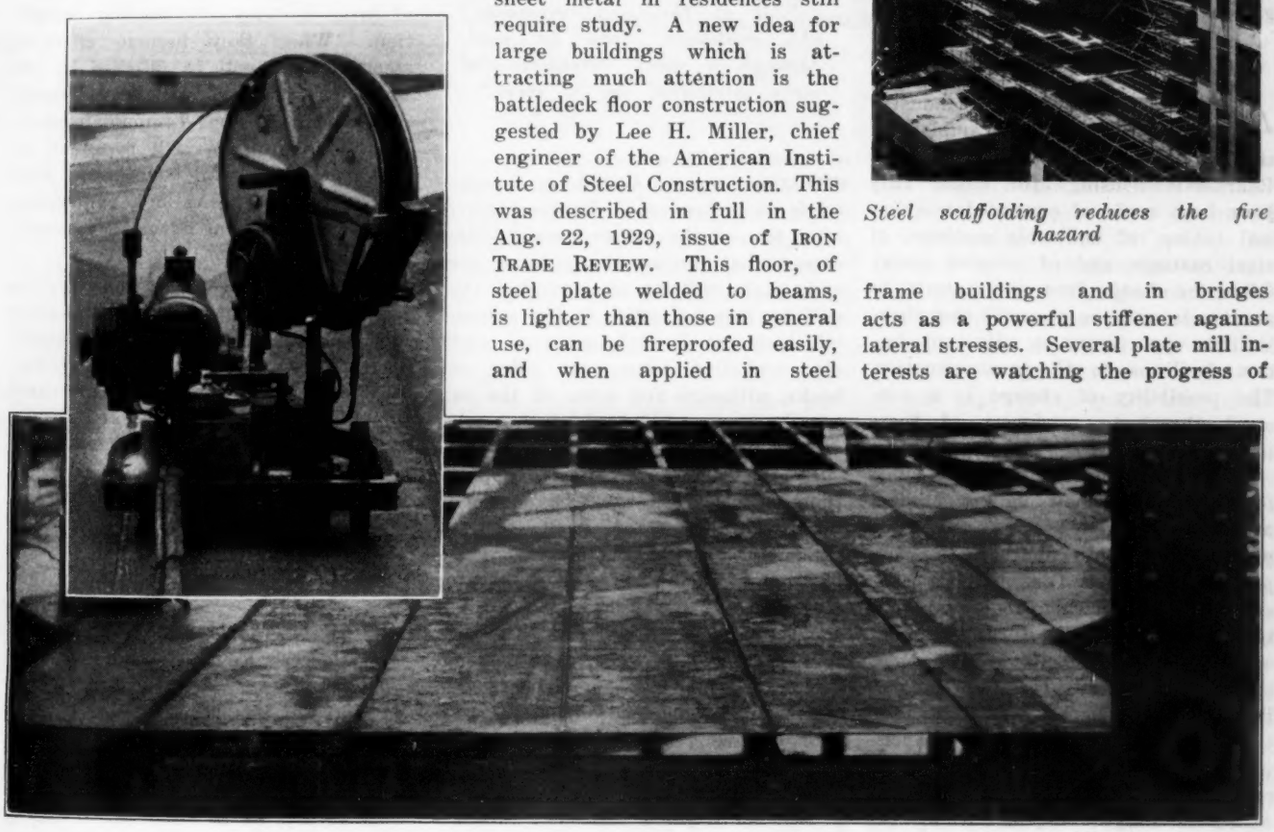
Promotion Work Stressed

CHANGES affecting the use of steel in buildings thus far have not been spectacular from a standpoint of tonnage, but the possibility of significant developments in this direction is recognized. The popularity of the wide-flanged beam and its encroachment on the preserves of the previously used built-up column are known to all in the steel industry. Small shapes for use in light buildings, as for example the Junior beams of the Jones & Laughlin Steel Corp., are widely employed. However, the ultimate solution of the problem of designing and constructing residences and small buildings of steel still lies in the future. The idea of steel frames for homes and apartments is gaining favor, especially for houses selling at more than $25,000. Numerous architects and builders are specializing on this type of construction and in general, their work is winning friends for steel.

Light pressed metal shapes are appearing more and more in recently built houses. Prepared wall board is supplanting plaster to some extent, and if this develops into general practice, expanded metal lath will suffer. Steel window frames, first introduced into residences for basements, now are frequently found above the first floor level.

All of these developments seem to indicate a striving to use steel intelligently and to combine its advantages with those of the various other new building materials which are being marketed. The opportunities for light shapes and for sheet metal in residences still require study. A new idea for large buildings which is attracting much attention is the battledeck floor construction suggested by Lee H. Miller, chief engineer of the American Institute of Steel Construction. This was described in full in the Aug. 22, 1929, issue of IRON TRADE REVIEW. This floor, of steel plate welded to beams, is lighter than those in general use, can be fireproofed easily, and when applied in steel frame buildings and in bridges acts as a powerful stiffener against lateral stresses. Several plate mill interests are watching the progress of

Steel scaffolding reduces the fire hazard



A recent installation of the "battledeck" flooring showing the special machine developed for welding the plates

this floor closely, realizing that its adoption would open an important new outlet for steel plates.

In the meantime steel continues to replace wood for many purposes in the building industries. Steel scaffolds rapidly are coming into favor. Steel towers for concrete pouring and for elevator frames for building erection have almost entirely supplanted wood construction. These and other changes are insignificant from a tonnage standpoint, but they illustrate the tendency to reduce the fire hazard on buildings under construction.

Equipment for modern households is requiring more and more sheet steel. Refrigerators, washing machines, stoves, card tables, chairs, cabinets, radiator covers, and bed room furniture are a few items in which sheet steel has won a firm footing.

However, persons who have studied the use of sheet metal products in Germany declare that the United States is far behind in the design and manufacture of steel cabinets. It is reported that in German cities one can purchase steel wardrobes, dressing tables, clothes closets, kitchen cabinets, kitchen sinks, etc. These are in convenient units, made so that they may be assembled in various combinations. Whether such articles would meet with favor in the United States is open to some doubt, but the subject would seem to be worth investigation.

Auto Industry Changes Materials

AT TIMES the automobile industry furnishes striking examples of the fickle character of steel markets. Rear axle housings for motor cars have been made of expanded mechanical tubing, of malleable castings, of steel castings and of pressed metal. Often the change from one material to another is made so abruptly that there is little opportunity to adjust production facilities to the new situation. The possibility of change is a constant threat to producers of these parts.

The manufacture of universal joints for automobiles shows how a product used for a given part may be displaced suddenly by another. A company which turns out 250,000 universal joints monthly, requiring 1500 tons of steel (mostly forgings) originally employed a solid steel bar for the connecting member between the two sets of companion flanges and two movable heads or joints comprising the universal joint assembly. The company discovered that the solid bar added to weight and vibration. As automotive power plant speeds increased it became important to have all component parts of the universal joint in absolute balance to avoid synchronous pulsation. Seamless tubing was utilized as a substitute for the heavy steel bar. Strength was retained and the weight lowered, but the wall thickness was not sufficiently uniform to prevent vibration at high speeds. The next step was to turn to sheets. Present connecting members are tubes made from welded steel sheets. They have the same strength as did the seamless drawn tubes at approximately one-half the weight.

Another distinct trend in automotive design is the use of wide strip steel. Strip 42 inches wide has been produced commercially and some installations are designed to produce up to 48 inches wide. Representatives of a few of the larger body builders expect that during the present year wide strip will be so perfected they will be able to utilize it for automobile body panels such as doors, cowls, etc., including some seat sides and backs, although for some of the latter sheets from 46 to 54 inches wide are required.

By far the most extensive applications of wide strip steel have been in the manufacture of front fenders, which incorporate the apron. Ordinary strip steel still is suitable for rear fenders, although it is true that some fender manufacturers still prefer sheets. The trend toward adoption of strip steel for fenders has been more pronounced during the past four or five years, particularly since the Ford Motor Co. changed from a 2-piece to a 1-piece fender.

For many years railroads have offered a stable tonnage market for steel. Their purchases consist largely of steel rails and plain rolled material such as plates, shapes and bars. The railroad market has been marked by few changes in class of steel used. In fact the conservatism of the transportation lines in adopting new materials is depriving them of numerous advantages. The roads have been unusually slow to take up alloy steels, although large savings unquestionably would reward their use on certain parts of locomotives.

During the past year several railroads ordered freight cars with bodies of copper bearing iron plates. It has been found that lighter plates can be used, as allowance for flaking from corrosion need not be made. Apparently this is the opening wedge in the railroads' battle with rust, which annually exacts a heavy toll in the depreciation of railroad rolling stock.

Present tonnage of steel rails is largely for replacements and enlargement of existing facilities. Trend to heavier motive power and loads constantly has dictated heavier sections. The heaviest rail now rolled weighs 136 pounds to the yard but relatively little of this weight is used, most large roads specifying 110 to 130 pounds for its heaviest main line steel.

However, the present unchanging character of railroad steel consumption is believed to be due for an awakening. The long discussed plans for consolidation of lines into a score of large systems are nearing completion. When they become effective, steel markets will be affected in two ways. First, there will be a general realignment of steel company customers. This probably will result in an exchange of railroad business by steel producers and in the long run should not seriously harm or greatly benefit producers.

The second outcome of consolidation will be the concentration of purchasing and specifying in more capable hands. The steel companies will have fewer, but better customers. The increased competition between larger and stronger railroad systems will stimulate engineering development, which is bound to awaken motive power authorities to the advantages of special steels. When this time arrives, surprising changes in railroad consumption of steel may be expected.

Success Rewards Vigilance

ENOUGH has been written to indicate that steelmakers must be alert if they are to hold their share of tonnage. Eternal vigilance, coupled with enterprise in technical research, constitute the best assurance of success in pursuing elusive markets for steel.

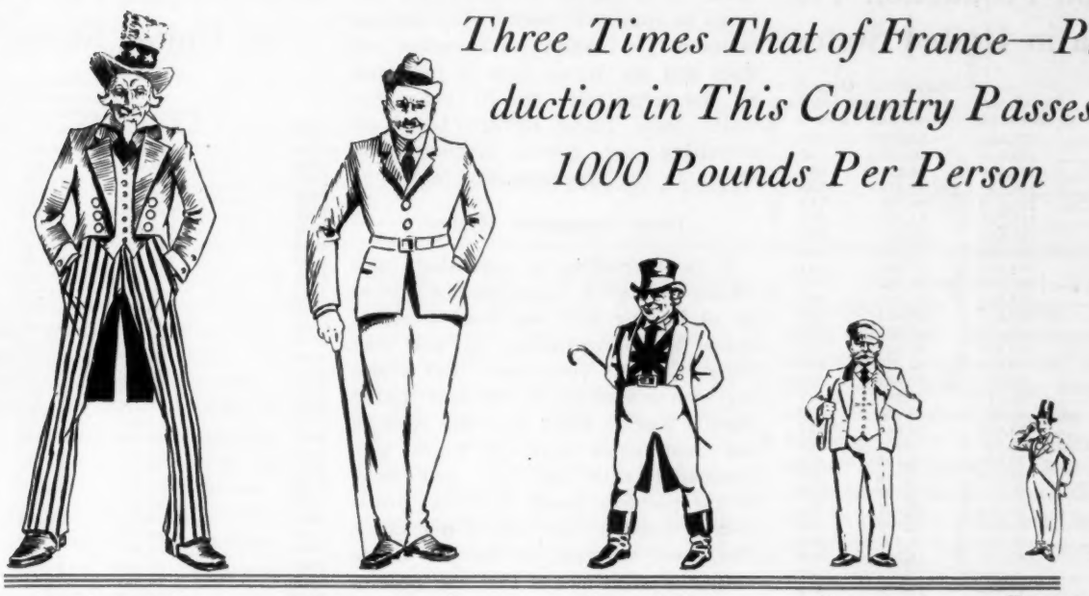
A Challenge to Steel!

ACCORDING to an eminent authority on household furnishings, the kitchen is the most neglected part of the modern American home. She declares that the windows should be redesigned to admit more light, better ventilation should be provided, walls should be made brighter and the equipment—including stove, refrigerator, table, sink, kitchen cabinet and shelves—should be designed for greater convenience.

"All of these improvements," she continues, "can be made through a more extensive and more intelligent use of steel."

United States Leads World in Per Capita Steel Consumption

More Than Twice That of Germany; Three Times That of France—Production in This Country Passes 1000 Pounds Per Person



A BLOCK of steel one foot square in cross section and two feet high weighs approximately 980 pounds. The average American could not lift it or tip it over, yet it represents less than the amount of steel consumed by or for him in the United States in 1929. The actual weight of the steel consumed per capita in the United States last year was 999 pounds. Assuming the weight of the average American to be 150 pounds, for every pound of his weight there was utilized in some form, in automobiles, building and in thousands of other ways, 6.66 pounds of steel.

Compared with the people of the French nation, the average American consumed more than three times the amount of steel in 1929 than did the average Frenchman. The American used more than twice that of the citizen of Germany, and nearly 1¾ times as much as that by the average British subject. The average person in Belgium-Luxemburg, taking the two countries together, came closest to consuming as much steel as the American, the per capita consumption in Belgium-Luxemburg amounting to 937 pounds. In every case consumption is production plus imports minus exports.

The record production and consumption of steel in the United States in 1929 is a reflection of the growing "steel consciousness" which not only is tending to increase its use where only this metal will serve the purpose, but also is multiplying the outlets for it in new forms.

Output Shows Large Gain

Steel production per capita, as distinguished from consumption, in the United States in 1929 was 1034 pounds. This was an increase of 72 pounds, or 7.4 per cent, over the preceding year. The output per capita for the one year, 1929, was as large as for all of the 12 years, 1878-1889, combined. It represents a gain of 39 per cent in ten years and of 75 per cent in 20 years.

The output of steel per capita has been growing much faster than that of pig iron, though when 1929 is compared with 1928 the gain for pig iron was slightly larger than that for steel. Pig iron production per capita in 1929 amounted to 787 pounds, an increase of 75 pounds, or 10.5 per cent, over 1928. The per capita output of pig iron last year was only as large as the total for the six years 1878-1883. It shows a gain of 19 per cent in ten years, and of 23 per cent in 20 years.

The spread between per capita production of pig iron and steel in the United States in 1929 was 247 pounds in favor of steel; in 1919 it was 76 pounds in favor of steel, and in 1909 it was 46 pounds in favor of pig iron.

Over the past 20 years the average annual per capita output of steel was 793 pounds, compared with 689 pounds of pig iron. In the 20 years preceding this period the production of pig iron was 394 pounds, against 321 pounds of steel. In the early period the per capita production of pig iron averaged 22.7 per cent over that of steel. In the past 20 years, the output of steel per capita has

averaged 15 per cent more than that of pig iron.

The population of the United States is estimated at 121,500,000, compared with 120,013,000 a year ago. Steel as referred to here includes ingots and castings. The production factor for 1929, used for computing the per capita figure, is 56,095,000 gross tons, which includes the known tonnage for the first 11 months of the year and IRON TRADE REVIEW'S estimate of the output for December. The production of pig iron, similarly calculated for 1929, is 42,700,000 gross tons.

As will be noted in the accompanying tables, the 1034 pounds per capita output of steel in 1929 was the highest ever recorded, and the first year in which it exceeded 1000 pounds. The previous highest figure was 987 tons in 1917. While pig iron production in the aggregate also set a new record in 1929, the per capita output of 787 pounds fell below that of three former years. In 1923 it was 806 pounds, in 1917 it was 846 pounds, and in 1916, 876 pounds, the latter being the all-time record.

Tremendous increases in automobile output, railroad and building construction, as well as the manufacture of new units of various descriptions, are the important factors which have caused steel to take the ascendancy over pig iron, on a per capita basis.

Many automobile parts and other items of equipment which formerly were made of iron now are made of steel. It is highly probable that the years to come will see a wider spread between per capita consumption of steel and pig iron. This is indicated by the trend over the 51 years for which IRON TRADE REVIEW has been compiling per capita statistics, as shown in the accompanying tables.

Price Composite Higher

It is interesting to note that IRON TRADE REVIEW'S composite of prices of 14 leading iron and steel products today is approximately 66 per cent higher than 15 years ago. Per capita pig iron output is 16 per cent higher than it was 15 years ago, and steel 42 per cent more than 15 years ago. Compared with the war and some of the postwar years, however, prices today show a substantial reduction. The great increase in the per capita output of steel means that the general public is getting more for its steel dollar today, in necessities, conveniences and luxuries, than ever before.

While production per capita indicates largely the volume of consumption, the two should not be confused, as when figuring consumption, exports and imports must be considered. The per capita consumption of steel in the United States on this basis was 999 pounds in 1929, or 35 pounds less than production.

This figure for consumption is arrived at by taking the 1929 output of steel ingots and castings as 56,095,000 tons, adding the imports of 665,000 tons and subtracting the exports of 2,560,000 tons. This leaves a calculated total 1929 consumption of 54,200,000 tons. The export and import figures do not include scrap, but they do include a little pig iron and ferroalloys. In the main, however, they represent finished steel products, and are the nearest approximation available for estimating actual consumption.

Great Britain's output of steel ingots and castings for 1929, with the last month of the year estimated by IRON TRADE REVIEW'S European manager was 9,820,000 gross tons. Its imports amounted to 2,770,000 tons, and its exports 4,400,000 tons, leaving a total consumption of 11,450,000 tons. The population is estimated as 44,173,000, and the calculated per capita consumption is 581 pounds.

France's output of steel ingots and castings for 1929 total 9,525,000 gross tons; its imports 270,000 tons, and exports 4,300,000 tons, leaving a consumption of 5,435,000 tons. The population is estimated as 40,750,000, and per capita consumption 299 pounds.

Germany's production of steel ingots and castings in 1929 was 16,200,000 tons. Its imports totaled 1,470,000 tons, and exports 5,500,000 tons, leaving consumption as 12,170,000 tons. Its population is estimated as 62,400,000, and its per capita consumption 438 pounds.

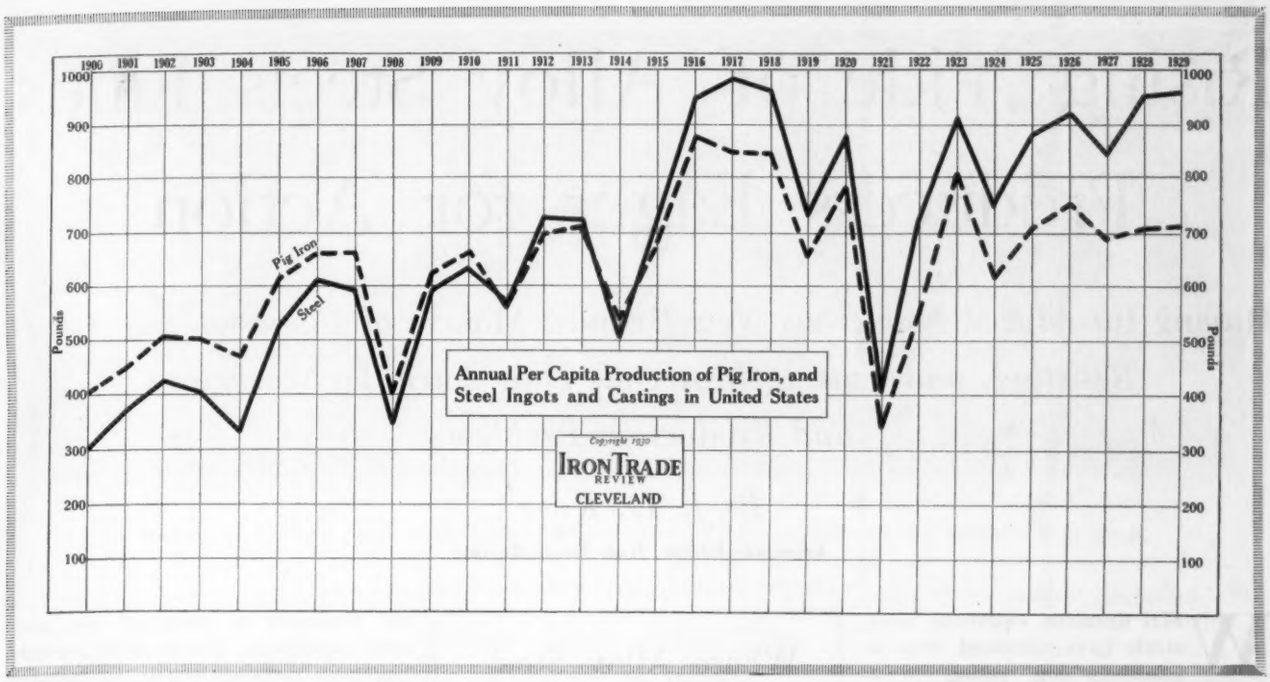
These figures indicate per capita steel consumption in the United States in 1929 was 418 pounds more than that of Great Britain; 700 pounds

Pig Iron Production Per Capita in United States

Year	Population in thousands	Output in gross tons, thousands	Output per capita, pounds
1929	121,500	42,700	787
1928	120,013	38,155	712
1927	118,628	36,511	691
1926	117,135	39,372	752
1925	115,378	36,700	713
1924	113,727	31,406	618
1923	111,693	40,361	806
1922	109,893	27,219	554
1921	108,445	16,688	344
1920	106,422	36,926	777
1919	105,003	31,015	661
1918	103,587	39,054	843
1917	102,172	38,621	846
1916	100,757	39,434	876
1915	99,342	29,916	677
1914	97,927	23,332	533
1913	96,512	30,966	717
1912	95,097	29,726	700
1911	93,682	23,649	564
1910	92,267	27,303	663
1909	90,556	25,795	638
1908	88,939	15,936	400
1907	87,320	25,781	661
1906	85,792	25,307	661
1905	84,085	22,992	612
1904	82,467	16,497	462
1903	80,848	18,009	500
1902	79,231	17,821	504
1901	77,612	15,878	458
1900	75,995	13,789	406
1899	74,318	13,620	409
1898	72,947	11,773	361
1897	71,592	9,652	302
1896	70,254	8,623	274
1895	68,934	9,446	306
1894	67,632	6,657	220
1893	66,349	7,124	239
1892	65,086	9,157	315
1891	63,844	8,279	289
1890	62,948	9,202	327
1889	61,298	7,603	277
1888	59,974	6,489	242
1887	58,680	6,417	244
1886	57,404	5,683	221
1885	56,148	4,044	161
1884	54,911	4,097	166
1883	53,693	4,595	191
1882	52,495	4,623	197
1881	51,316	4,144	188
1880	50,156	3,835	171
1879	48,886	2,741	125
1878	47,598	2,301	108

Steel Output Per Capita in United States

Year	Population in thousands	Steel ingots and castings gross tons, thousands	Output per capita, pounds
1929	121,500	56,095	1,034
1928	120,013	51,544	962
1927	118,628	44,935	848
1926	117,136	48,294	924
1925	115,378	45,394	881
1924	113,727	37,932	746
1923	111,693	44,943	911
1922	109,893	35,603	726
1921	108,445	19,783	409
1920	106,422	42,132	887
1919	105,003	34,671	739
1918	103,587	44,462	961
1917	102,172	45,060	987
1916	100,757	42,773	950
1915	99,342	32,151	724
1914	97,927	23,513	509
1913	96,512	31,300	725
1912	95,097	31,251	736
1911	93,682	23,676	565
1910	92,174	26,094	634
1909	90,556	23,955	592
1908	88,939	14,023	353
1907	87,320	23,362	599
1906	85,702	23,398	611
1905	84,085	20,023	533
1904	82,467	13,859	335
1903	80,848	14,534	402
1902	79,231	14,947	422
1901	77,612	13,473	375
1900	75,995	10,188	300
1899	74,318	10,639	320
1898	72,947	8,932	274
1897	71,592	7,156	223
1896	70,254	5,281	168
1895	68,934	6,114	198
1894	67,632	4,412	146
1893	66,349	4,019	135
1892	65,086	4,927	169
1891	63,844	3,904	121
1890	62,948	4,277	152
1889	61,298	3,385	123
1888	59,974	2,899	108
1887	58,680	3,339	127
1886	57,404	2,562	99
1885	56,148	1,711	68
1884	54,911	1,550	63
1883	53,693	1,673	69
1882	52,495	1,736	74
1881	51,316	1,588	69
1880	50,156	1,247	55
1879	48,886	935	42
1878	47,598	732	34



more than that of France, and 561 pounds more than that of Germany.

Figures similarly calculated for Belgium and Luxemburg indicate these two combined had a per capita consumption of steel in 1929 of 937 pounds, the largest in Europe, and only 62 pounds less than that for the United States. The output of steel ingots and castings was 6,885,000 tons. The two countries are grouped for the purpose of this comparison because statistics pertaining to imports and exports are not kept separately by the Belgium-Luxemburg Economic union. Their combined imports were 1,015,000 tons, and exports 4,500,000 tons, leaving consumption as 3,400,000 tons. The population of the two countries is about 8,150,000.

Finance Is Bringing New Leadership To Steel

(*Concluded from Page* 6)

plant at Buffalo, checkmating moves would seem logical. There are some who believe they detect a faint veering of the Youngstown Sheet & Tube Co., long friendly to Bethlehem and in which the Mather interests are powerful, from the Eaton group to Bethlehem.

In the formation of the National Steel Corp. by the union of the Weirton Steel Co., the Great Lakes Steel Corp., now constructing a strip mill at Detroit, and certain subsidiaries of the M. A. Hanna Co., may also be seen the effects of financial management. Here, too, is a marriage of related properties to form an integral unit, with production happily located with respect to the important consuming markets of the Middle West.

The same forces have been at work in pig iron. Through the abandonment of obsolete stacks—19 having been dropped in 1929—the consolidation of merchant production in the Pittsburgh district under auspices of the Davison Coke & Iron Co., the closer relationship between the merchant and steelworks interests, minimizing dumping of surplus production by the latter, all have tended to bring markets under closer control.

Only in size of pattern does the formation of the Interlake Iron Corp., wherein all the strictly merchant stacks on the American side of the Great Lakes, owned by the Toledo Furnace Co., By-Products Coke Corp., Zenith Furnace Co. and Perry Iron Co., were merged, differ from the larger Republic merger. Here iron ore, vessels, coal, by-products of coking, and pig iron are inter-related to form a self-contained unit.

A grave consequence of the changing management in iron and steel may develop in the Great Lakes vessel situation in 1930. For many years the Steel corporation's iron ore and coal-carrying fleet on the Great Lakes—the Pittsburgh Steamship Co.—has been inadequate to handle all of the corporation's traffic. But through a program of replacement of small bulk freighters by steamers of the largest type, the corporation will shortly be nearly self-sufficient.

Many of the other large consumers of iron ore, such as the new Republic group, Bethlehem, Youngstown, National Steel and Inland, either have their own lake fleets or are closely allied with the Pickands-Mather and Cleveland-Cliffs shipping interests. With the Steel corporation at least a diminished factor—if one at all—in the open market for lake bottoms, and other blast furnaces having new connections, there is a considerable tonnage of independent lake shipping confronted with a noteworthy shrinkage in demand. This may be reflected in efforts of certain independent vessel interests to merge.

Advantage for Practical Steel Man

Powerful and compelling as finance has been in the management of the iron and steel industry in the past year, the practical steel man has not been eclipsed. Rather, with finance to suggest and take advantage of opportunities which he himself could not visualize on account of the necessity of close application to the task of production, the practical steel man has had better tools and broader markets placed at his disposal.

The new products and the more extensive research work made possible are enabling the steel industry to combat the competition of encroaching materials, and to reach out for new markets. The leadership and vision supplied by finance are giving new impulse to the potentialities of the practical steel man.

And apparently greater benefit is accruing to the consumer of iron and steel. All research, all improvements in merchandising, all economies effected by consolidations and strengthened financial setups are directed toward providing the consumer with better material, more promptly, at less cost. Finance realizes the test of its vision and leadership is service.

Rising Tide of Alloy Steels Finds Producers Eager for Action

Having Introduced Numerous New Brands, Makers of Corrosion and Heat-Resisting, and Cutting Materials Now Turn To Marketing and Production Problems

By J. D. Knox

Associate Editor, Iron Trade Review

WITH dramatic swiftness, alloy steels have advanced from a relatively low rating to a position of recognized importance in the list of steel products. The ascendancy was given a strong impetus late in 1928 by the introduction in America of a number of German products, notably the nirosta heat and corrosion-resisting steels and the tungsten-carbide cutting materials. Throughout 1929 these new alloy products, and others of foreign and American origin, have commanded keen attention in all branches of the steel industry.

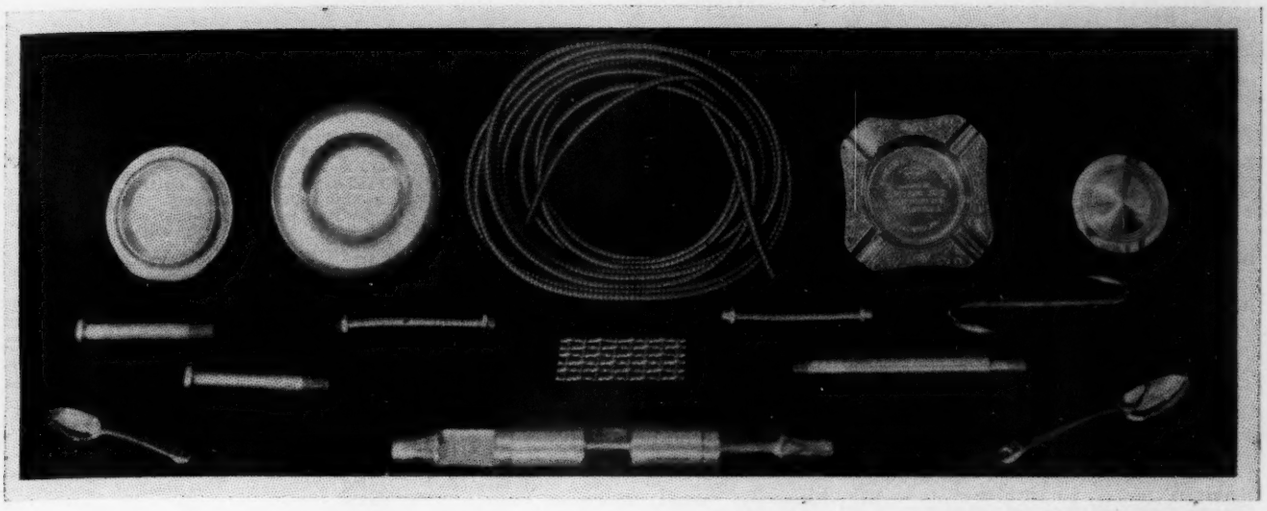
Thus far the rising tide of alloys has been felt more in the number of new products introduced than in actual production. Apparently the major resources of many of the alloy steel producers, which until recently had been devoted largely to research and to the development of new products, now will be directed toward production and marketing. At this moment, a number of the leading interests in the field are engaged in intensive studies of markets and in perfecting production facilities.

Therefore, while 1929 was marked chiefly by the introduction of new alloy products, it may be predicted that 1930 will witness an intensive campaign to educate consumers in the proper application of these products. In other words, the seeds of invention and development sowed in 1929 will

Where Alloy Steel Went in 1929

	Per cent
Automotive industry	61.40
Miscellaneous	17.80
Machine tool industry	6.34
Oil industry	4.07
Agricultural industry	4.05
Construction	3.72
Export trade	1.38
Railroad industry	1.02
Shipbuilding industry	0.22

Metalware of Enduro Nirosta KA2, a heat and corrosion resisting steel produced by Central Alloy Steel Corp., Ludlum Steel Co. and the Babcock & Wilcox Tube Co.



A display of articles made from a new chromium-iron alloy produced by the Rustless Iron Corp.

yield their harvest of tonnage in 1930 or perhaps later.

This assumption is corrobrated by IRON TRADE REVIEW'S annual analysis of alloy steel production and distribution. The leading producers, whose figures have been available during a period of four years and therefore are comparable, reported outputs in 1929 averaging about 15 per cent in excess of the corresponding tonnage which they reported in 1928. Using this factor and applying it to the total alloy ingot production of 3,500,000 gross tons for 1928, as compiled by the American Iron and Steel institute, we arrive at a computed figure of 3,500,000 tons as the indicated alloy steel ingot output for 1929.

Considering the attention accorded new alloy products during the past year, this modest increase seems inadequate. The only explanation is that the new alloys are not yet in production to a sufficient extent to appreciably affect the total output of the country.

How Alloy Steel Was Used in 1929

	Per cent
Hot rolled bars	61.87
Cold drawn bars	11.43
Sheets	11.03
Pipes and tubes	6.33
Hot rolled strip	4.43
Forgings	2.25
Tool steel	1.36
Plates	1.04
Structural shapes	0.12
Cold rolled strip	0.09
Wire	0.05

The percentages shown in the accompanying tables are based on reports received from all but one of the companies producing in excess of 100,000 tons annually, and from a majority of the smaller companies. The ingot production of those reporting is slightly more than 60 per cent of the estimated total for the entire country.

In reality the various returns are more representative of the industry than is indicated by this ratio. This is due to the fact that there is no accepted definition of alloy steel. In some quarters copper-bearing steel is classified as alloy, and in others it is designated as carbon steel. Until the basis for this misunderstanding is removed, and agreement is reached on manganese rails and several other products whose status now is in doubt, it will be exceedingly difficult to coordinate alloy steel production and distribution figures with the annual reports of the American Iron and Steel institute. For this reason, IRON TRADE REVIEW'S figures cannot be offered as conclusive. However, it is believed that they serve a useful pur-

Distribution by Percentage of Alloy Steel in 1929

Shown by Consuming Groups and Individual Products

Group	Hot rolled bars, per cent	Cold drawn bars, per cent	Sheets, per cent	Plates, per cent	Pipe and tubes, per cent	Wire, per cent
1. Automotive industry	69.36	78.53	3.02	43.88	90.00	100.00
2. Machine tool industry	7.07	3.94	2.72	1.90	.....	.....
3. Railroad industry	1.30	.....	.....	2.11	.....	.....
4. Agricultural industry	3.86	2.49	.....	.....	7.87	.....
5. Construction	0.15	1.24	25.79	36.27	.....	.....
6. Shipbuilding industry	0.07	0.65	.....	.....	.....	.....
7. Oil industry	3.42	5.15	.....	.....	1.46	.....
8. Exports	2.03	0.32	0.08	.....	.....	.....
9. All other requirements	12.74	7.68	68.39	15.84	0.67	.....

Group	Structural shapes, per cent	Merchant shapes, per cent	Hot rolled strip, per cent	Cold rolled strip, per cent	Tool steel, per cent	Forgings per cent
1. Automotive industry	21.42	.....	56.58	.....	23.38	5.31
2. Machine tool industry	2.12	.....	1.61	100.00	51.50	15.04
3. Railroad industry	.....	.....	.....	.....	2.18	7.38
4. Agricultural industry	.....	.....	19.05	.....	2.44	.....
5. Construction	64.51	.....	3.21	.....	1.23	1.46
6. Shipbuilding industry	.....	.....	.....	.....	0.87	3.69
7. Oil industry	.....	.....	16.05	.....	1.75	23.74
8. Exports	.....	.....	0.93	.....	0.16	1.72
9. All other requirements	11.95	.....	2.57	.....	16.49	41.66

ASCENDANCY OF ALLOY STEELS LENDS

A

A-B-C; a weldable steel containing tungsten and chromium; Darwin & Milner, Inc., Cleveland.

ADVANCE; for rheostats, resistance spools, thermocouples, etc.; nickel 45, copper 55 per cent; Driver-Harris Co., Harrison, N. J.

AMBRAC METAL; a corrosion-resisting alloy; nickel 20, copper 75, zinc 5 per cent; American Brass Co., Waterbury, Conn.

AMPCO METAL; an alloy resistant to high temperature and corrosion; copper 80 to 90, aluminum 8 to 10 and iron 6 to 7 per cent; American Metal Products Co., Milwaukee.

AMSCO; a high manganese steel; resistant to abrasion; for dipper teeth, draw bench chains, wheels, ball mill liners, etc.; Michigan Steel Co., Chicago Heights, Ill.

ASCOLOY No. 33; an alloy resistant to abrasion and corrosion; chromium 12 to 16, nickel under 0.5 per cent; Allegheny Steel Co., Brackenridge, Pa.

ASCOLOY No. 44; an alloy resistant to high temperatures and corrosion; chromium 22 to 25 and nickel 10 to 13 per cent; Allegheny Steel Co., Brackenridge, Pa.

ASCOLOY No. 55 (chromium 26 to 30, nickel under 0.6 per cent); No. 66 (chromium 16 to 19, nickel under 0.5 per cent); an alloy resistant to corrosion, Allegheny Steel Co., Brackenridge, Pa.

B

BARBERITE; an alloy containing copper 88.5, nickel 5.0, tin and silicon 1.5 per cent; corrosion-resisting; Barber Asphalt Co., Philadelphia.

BIRDSBORO Nos. 26 and 30; No. 26 for its high physical properties and great strength; No. 30 for corrosion and fatigue-resisting; Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

BLOCKOR; a tungsten-carbide alloy for tipping tools; Blockor Co., Los Angeles, Calif.

BUSTER; a low-carbon, tungsten-chromium steel; for chisels, dies, etc.; Columbia Tool Steel Co., Chicago Heights, Ill.

C

CALITE; Grade "A" (carbon 0.80, nickel 35, chromium 15 per cent) a heat-resisting alloy for carburizing boxes, retorts and hearth plates; Grade "B," (carbon 1.50, nickel 6, chromium 18 per cent), for elevated temperatures; Calorizing Co., Pittsburgh.

CAMITE; a tungsten-carbide cutting material; Cleveland Automatic Machinery Co., Cleveland.

CANNON; a high-speed tungsten-chromium steel; Darwin & Milner, Inc., Cleveland.

CARBOLOY; an alloy of tungsten-carbide and cobalt; for high-speed cutting; Carboloy Co., Inc., New York.

CARPENTER Nos. 314, 317 and 408; chrome-nickel steels with chromium from 0.75 in No. 408 to 1.50 in No. 314 and nickel from 1.75 in No. 317 to 3.50 per cent in No. 314; for heat treated machine parts; Carpenter Steel Co., Reading, Pa.

CARPENTER No. 158 chrome-nickel steel (chromium 1.50, nickel 3.50 per cent); for case hardened machine parts; Carpenter Steel Co., Reading, Pa.

CARPENTER No. 626 chrome-nickel steel; an air-hardening steel for machine parts; Carpenter Steel Co., Reading, Pa.

CARPENTER STAINLESS, Nos. 1, 2, 3, 4 and 5; chromium steels for resisting heat and corrosion; Carpenter Steel Co., Reading, Pa.

CHROMAX; a heat-resisting alloy (nickel 35 and chromium 15 per cent); Driver-Harris Co., Harrison, N. J.

CHROME MAGNET; a 3.50 per cent chromium steel for magnets; Carpenter Steel Co., Reading, Pa.

CHROMEL No. 502; a heat-resisting alloy containing 30 to 34 nickel, 18 to 22 chromium and 38 to 48 per cent iron; Hoskins Mfg. Co., Detroit.

CIMET; a corrosion-resisting alloy in the form of bars and castings; for mine water pumps; chromium 25 and 75 per cent iron; Driver-Harris Co., Harrison, N. J.

CIRCLE C; a high-speed steel for cutting harder metals; Firth-Sterling Steel Co., McKeesport, Pa.

CLARITE; a moderate high-speed steel, employing tungsten, chromium and vanadium in combination with fine irons; for lathe tools, dies, blanking and punching; Columbia Tool Steel Co., Chicago Heights, Ill.

CNM; a chrome-nickel alloy possessing wear-resisting qualities; George H. Smith Steel Casting Co., Milwaukee.

COBALTCROM "PRK 33"; a nondeforming, airhardened steel; Darwin & Milner, Inc., Cleveland for bar stock and forgings; Detroit Alloy Steel Co., Detroit for castings.

COLHED; a carbon-vanadium tool steel; for dies; Vanadium-Alloys Steel Co., Latrobe, Pa.

COLONIAL, H. H. No. 3 (containing tungsten chromium and vanadium), Gripper (containing chromium), and Hot Header (containing chromium and vanadium); for heat resisting purposes; Colonial Steel Co., Pittsburgh.

COLONIAL STAINLESS STEELS, Type "A" (chromium 14), "B" (chromium 16.50), "I" (chromium 14), "N" (chromium 18, nickel 8), "U" (chromium 18, nickel 8, copper 1.50 and molybdenum 1.50 per cent); for corrosion and heat-resisting purposes; Colonial Steel Co., Pittsburgh.

COLUMBIA DOUBLE SPECIAL; a water-hardening, high-carbon, tungsten-chromium alloy steel; for fast finishing work, corrugated chilled rolls, etc.; Columbia Tool Steel Co., Chicago Heights, Ill.

COLUMBIA EXTRA; a carbon tool steel; for shear blades, punches, dies, cold chisels and boilermaker's tools; Columbia Tool Steel Co., Chicago Heights, Ill.

COLUMBIA SPECIAL; a carbon tool steel with strength and toughness with hardness; for dies, punches, taps, etc.; Columbia Tool Steel Co., Chicago Heights, Ill.

COLUMBIA STANDARD; a straight carbon steel; for mandrels, forming rolls, machine parts, hammers, etc.; Columbia Tool Steel Co., Chicago Heights, Ill.

CORROSOIRON; an acid-resisting iron; silicon 13.50, iron 85.5 per cent; Pacific Foundry Co., San Francisco, Calif.

CRISTITE No. 1; a heat-resisting alloy (tungsten 17, chromium 10 and molybdenum 2.5 per cent); Commercial Alloys Co., San Francisco, Calif.

CROCAR; a heat-resisting alloy in the form of bars, sheets and wire; composed of chromium 12, vanadium 0.75 and cobalt 0.75 per cent; Vanadium Alloys Steel Co., Latrobe, Pa.

CRO-MOL; an alloy cast steel containing chromium and molybdenum; for hammer parts, rams, dies and sow blocks; Wheeling Mold & Foundry Co., Wheeling, W. Va.

CROMOVAN; a high-carbon, high-chromium die steel for high-production work; Firth-Sterling Steel Co., McKeesport, Pa.

CRUCIBLE STAINLESS STEELS; No. 12 (chromium 11.5 to 13.0 per cent), No. 18 (chromium 17 to 19 per cent), No. 24 (chromium 23 to 30 per cent), Grade "A" (chromium 12.5 to 14.0 per cent) Grade "B" (chromium 16.0 to 17.5 per cent); for corrosion-resisting purposes; Crucible Steel Co. of America, New York.

CUYO; stainless and heat-resisting steels in sizes from 1/16-inch round up to 2½-inch rounds, inclusive in all analyses; also special shapes, squares, flats, etc.; Cuyahoga Steel & Wire Co., P. O. Station D, Cleveland.

CYCLOPS; B-6 (chromium 4, tungsten 18, vanadium 1 per cent), a high-speed steel for lathe tools; B-7 (same analysis as B-6 with 4 per cent cobalt), a high-speed steel for heavy cutting; B-8 (chromium 4, tungsten 14, vanadium 3, cobalt 4.25 per cent), a high-speed steel for heavy work; K Steel (chromium and tungsten 8 per cent each), hot work, rustless; Cyclops Steel Co., Titusville, Pa.

CYCLOPS No. 17; a noncorrosive steel for pump rods, still plugs, thermocouple wells, turbine blades, etc.; chromium 8, nickel 20 per cent; Cyclops Steel Co., Titusville, Pa.

CYCLOPS STAINLESS; Grade "A" (chromium 12.50, nickel 0.50 maximum); Grade "B" (chromium 17, nickel 0.50 maximum); Cyclops Steel Co., Titusville, Pa.

D

DARWIN 505 and 1366; a high-speed steel containing tungsten, cobalt and molybdenum; Darwin & Milner, Inc., Cleveland.

DARWIN COBALT MAGNET; a steel for permanent magnets containing cobalt; Darwin & Milner, Inc., Cleveland.

DAVIS METAL; a corrosion-resisting iron; for valves and fittings; carbon and silicon 0.5, manganese 1.5, nickel 20, iron 2, copper 67 per cent; Chapman Valve Mfg. Co., Indian Orchard, Mass.

DEFIHEAT RUSTLESS IRON; a corrosion-resisting alloy; chromium 25 to 30, manganese under 0.5, carbon 0.25 per cent and nickel a trace; Rustless Iron Corp. of America, Baltimore, Md.

DEFIRUST RUSTLESS IRON; a corrosion-resisting alloy; chromium 12 to 14, manganese under 0.5, carbon under 0.1 per cent and nickel a trace; Rustless Iron Corp. of America, Baltimore.

DEFISTAIN RUSTLESS IRON; a corrosion-resisting alloy; chromium 17 to 19, nickel 7 to 10, manganese under 0.5, carbon 0.2 per cent; Rustless Iron Corp. of America, Baltimore, Md.

DELHI HARD; a corrosion-resisting alloy in the form of bars; chromium 16.5 to 18, carbon 1 to 1.1, silicon 0.75 to 1, manganese 0.35 to 0.5 per cent; Ludlum Steel Co., Watervliet, N. Y.

DIMONDITE; a tungsten-carbide cutting material; carbon 3.91 and tungsten 95.65 per cent; Firth-Sterling Steel Co., McKeesport, Pa.

DURALOY; "A" (27 to 30 chromium), "B" (16 to 18 chromium), "C" (12 to 14 chromium), "N" (21 to 24 chromium, 12 nickel), "18-8" (18 chromium, 8 nickel), "15-35" (15 chromium, 35 per cent nickel); for resisting corrosion; The Duraloy Co., Pittsburgh.

DURIMET; B (nickel 35, chromium 12 per cent), *Ab* (nickel 25 per cent), *Db* (nickel 15, and chromium 2.5 per cent); a heat and corrosion-resisting alloy; Duriron Co., Dayton, Ohio.

E

ELCOMET; a nickel-chromium steel alloy of high-silicon content; resistant to corrosion; for spinner heads, valves, pumps, etc.; La Bour Co. Inc., Elkhart, Ind.

ELVERITE; special castings with wear-resisting qualities; for tube mill linings, wheels, jaw crushers, sprockets, etc.; Fuller Lehigh Co., Fullerton, Pa.

ENDURO A; a heat-resisting alloy; chromium 16.5 to 18.5, silicon 0.75 and carbon 0.1 per cent maximum; Ludlum Steel Co., Watervliet, N. Y.

ENDURO, KA 2 (18 chromium, 8 nickel), AA (18 chromium), S and S-15 (13 per cent chromium); stainless irons resistant to heat and corrosion; Central Alloy Steel Corp., Massillon, O.

EVANSTEEL; a nickel-chrome alloy possessing wear-resisting qualities; for tractors, wheel castings, switch points, dies, ball mills, oil-pipe clamps, wheels, etc.; Chicago Steel Foundry Co., Chicago.

EVERBRITE; No. 90 (nickel 35, copper 60 per cent), for valves and chemical plants; No. 92 (nickel 35, copper 58 per cent), for high-pressure steam valves, chemical plants; Curtis Bay Copper & Iron Works, Baltimore.

EVERDUR, an acid-resisting alloy; silicon 4.5, manganese 1, copper 94.5 per cent; American Brass Co., Waterbury, Conn.

F

FAHRALLOY; contains from 28 chromium without nickel to 18 chromium and 70 per cent nickel; for all heat and corrosion-resisting purposes; Southern Manganese Steel Co. (Division of American Manganese Steel Co.), St. Louis.

FAHRITE; an alloy with heat-resisting qualities; for stirring arms, pots, retorts and furnace parts; The Ohio Steel Foundry Co., Springfield, O.

FARRELL'S 85; a molybdenum-chrome steel for resisting wear and abrasion and possessing high strength, toughness and rigidity; Farrel-Cheek Steel Foundry, Sandusky, O.

FIREARMOR; an alloy resistant to abrasion; nickel 60, chromium 20, iron 10, manganese 1.75, and carbon 0.5 per cent; Michiana Products Corp., Michigan City, Ind.

FIREX; a special alloy steel containing nickel and chromium; Darwin & Milner, Inc., Cleveland.

FIRTHALOY; a cemented tungsten carbide in form of nibbs for wire drawing dies; Firth-Sterling Steel Co., McKeesport, Pa.

FIRTHITE, a cemented tungsten carbide in form of tipped cutting tools, blanks, etc.; Firth-Sterling Steel Co., McKeesport, Pa.

FLEXO; for springs and heat treated machine parts; Carpenter Steel Co., Reading, Pa.

FLINTCAST; an abrasion-resisting iron, Pacific Foundry Co., San Francisco, Calif.

H

HARGUS; an oil-hardening tool steel; for taps, dies, reamers, gages, etc., Ziv Steel & Wire Co., Chicago.

HASTELLOY; A (nickel 60, molybdenum 20 per cent), (iron, molybdenum and nickel), D (nickel 90, copper 3, aluminum 1.5 per cent and silicon plus or minus 10); an alloy resistant to high temperatures and corro-

NEW SIGNIFICANCE TO TRADE NAMES

sion; Haynes Stellite Co., Kokomo, Ind.

HAYSTELLITE; a tungsten-carbide cutting material in cast form; Haynes Stellite Co., Kokomo, Ind.

HIOLOY; Grade W (resistant to abrasion), Grade SW (resistant to shock and abrasion), Grade CU (resistant to corrosion); The Ohio Steel Foundry Co., Lima, Ohio

HIPERNICK; a high-permeability alloy; for electrical usage; nickel and iron, 50 per cent each; Western Electric Co., Chicago.

HUBBARD SPECIAL; a nickel-chrome steel; for wear-resisting rolls and miscellaneous castings; Hubbard Steel Foundry Co., East Chicago, Ind.

HYB-LUM; a corrosion-resisting, general purpose alloy containing from 2 to 2½ per cent chromium, nickel and other metals of the chromium group; and pure aluminum; Sheet Aluminum Corp., Jackson, Mich.

I

IDEOR; a special alloy containing tungsten and chromium; Darwin & Milner, Inc., Cleveland.

ILLIUM; a heat and corrosion-resisting alloy containing 60 nickel, 25 chromium, 7 copper, 4 molybdenum, 2 manganese, 1 silicon and 1 per cent tungsten; Burgess-Parr Co., Moline, Ill.

K

KINITE; a high-carbon and alloy steel; resistant to abrasion and compression; for dies, anvils, cutters, mandrels, machine parts, press tools, etc.; The Kinite Corp., Milwaukee.

KONEL; nickel 78, cobalt 17.5, iron 6.5, titanium 2.5 and manganese 0.2 per cent; an alloy in the form of bars, sheets and wire resistant to high temperatures; Westinghouse Research Laboratories, East Pittsburgh, Pa.

L

LXX; a high-speed steel for general work; turning, cutting, milling, drilling, tapping and reaming tools, dies: Ludlum Steel Co., Watervliet, N. Y.

M

MANGANIN; for instrument shunts, resistance standards, etc. in wire form; manganese 12, nickel 4, copper 84 per cent; Driver-Harris Co., Harrison, N. J.

MAXITE; a low-tungsten, cobalt, chromium, high-vanadium steel; for cutting steel with high resistance to abrasion; Columbia Tool Steel Co., Chicago Heights, Ill.

MAXTENSILE; a chrome-nickel iron; for hydraulic castings, sliding parts, spindles, couplings, sprockets, mill rolls, etc; Farrel-Birmingham Co., Ansonia, Conn.

MEEHANITE METAL; carbon 2 to 3, silicon 1 to 24, phosphorus 0.1, sulphur 0.04 to 0.14 per cent; a metal resistant to abrasion; Ross-Meehan Foundries, Chattanooga, Tenn.

MIDVALE; ATV I (nickel 33 to 39, chromium 10 to 12 per cent), ATV 3 (nickel 25 to 28, chromium 13 to 15 and tugnsten 3 to 4 per cent), BTG (nickel 60 to 62, chromium 10 to 11, and tungsten 2 to 2.5 per cent) HR (chromium 20, nickel 7, tungsten 4 per cent), V2A (chromium 17 to 19, and nickel 8 to 9 per cent); alloys in bar form resistant to high temperatures; Midvale Co., Philadelphia, Pa.

MIDVALE STAINLESS IRON; iron, 85 to 89, chromium 10 to 14, manganese under 0.5, and carbon under 0.13 per cent; an alloy resistant to abrasion, high temperatures, and corrosion; Midvale Co., Philadelphia.

MISCO, "Standard," "C" and "HN"; alloy steel containing various percentages of chromium and chromium-nickel; for heat, wear and corrosion-resistance; Michigan Steel Casting Co., Detroit.

MOHAWK; a low-tungsten high-speed steel; bolt heading dies, hot punches, tong bits, extrusion dies; Ludlum Steel Co., Watervliet, N. Y.

MOLYBDIE; an alloy steel containing molybdenum; for dies; A Finkl & Sons Co., Chicago.

MONEL METAL; a corrosion-resisting metal; manganese 2, nickel 67, iron 2, copper 28 per cent; International Nickel Co., New York.

N

NA; alloy steel castings, resistant to oxidation, corrosion and abrasion; National Alloy Steel Co., Blawnox, Pa.

NEOR; a high-carbon chrome steel; nondeforming and oil hardening; Darwin & Milner, Inc., Cleveland.

NEVASTAIN A and B; stainless cutlery steels; chromium 14 and 17 per cent respectively, medium carbon; Ludlum Steel Co., Watervliet, N. Y.

NICHROME; nickel 60, iron 24, chromium 16, carbon 0.1 per cent; an alloy in the form of bars, sheets, tubing and wire; resistant to high temperatures; Driver-Harris Co., Harrison, N. J.

NICHROME IV; a heat-resisting alloy; composed of 60 to 80 nickel and 12 to 20 per cent chromium; Driver-Harris Co., Harrison, N. J.

NIROSTA; a nonrusting steel; chromium 18 and nickel 8 per cent; Central Alloy Steel Corp., Massillon, O., Ludlum Steel Co., Watervliet, N. Y., Firth-Sterling Steel Co., McKeesport, Pa.; boiler tubes, Babcock & Wilcox Tube Co., New York; pipe, Spang, Chalfant & Co., Pittsburgh; plates, Lukens Steel Co., Coatesville, Pa.

NITRALLOY; a chromium-molybdenum-aluminum steel capable of developing extreme hardness through nitriding; Central Alloy Steel Corp., Massillon, O.

O

OILDIE; an oil hardening, nondeforming, chromium-tungsten tool steel; for blanking, piercing, shaving, notching and trimming dies; Columbia Tool Steel Co., Chicago, Heights, Ill.

P

PANTHER, Special and Super grades; high-speed steels for machining heat treated materials, drop forgings, steel and iron castings; Ludlum Steel Co., Watervliet, N. Y.

PERMALLOY; a high-permeability alloy for electrical usage; nickel 78, iron 22 per cent; Western Electric Co., Chicago.

PLYMITE; a tungsten alloy resistant to abrasion; P. L. & M. Co., Los Angeles, Cal.

PRESTO; a 1.40 per cent chromium steel for ball bearings, etc.; Carpenter Steel Co., Reading, Pa.

PYRASTEEL; a chrome-nickel-silicon alloy possessing heat-resisting qualities; for carburizing boxes, anealing pots, skid rails. Chicago Steel Foundry Co., Chicago.

PYROCAST; a nickel-chrome iron resistant to high temperatures; Pacific Foundry Co., San Francisco, Calif.

Q

Q-ALLOYS; resistant to abrasion and high temperatures; for hearth plates, rails, retorts, muffles, etc.; General Alloys Co., Boston, Mass.

R

RCF; a chrome-nickel alloy possessing wear-resisting qualities; George H. Smith Steel Casting Co., Milwaukee.

RESISTAC; an acid-resisting metal composed of 90 copper, 9 aluminum, and 1 per cent iron; American Manganese Bronze Co., Philadelphia, Pa.

REZISTAL; KA-2, Grade 2-B, 2-C, 4, 7, 255-C, 355-C and 2600; chromium-nickel alloy steels; resistant to high temperatures; Crucible Steel Co. of America, New York.

ROL-MAN MANGANESE STEEL; manganese 11 to 14, carbon 1 to 1.3 per cent; a manganese steel in bar, sheet and wire form; resistant to abrasion; Manganese Steel Forge Co., Philadelphia, Pa.

S

SAMSON; a chrome-nickel steel for heat treated machine parts; Carpenter Steel Co., Reading, Pa.

SATURN; for wire-drawing plates; carbon 1.25, tungsten 3.50 per cent; Cyclops Steel Co., Titusville, Pa.

SMITHCO DYNAMO; an alloy steel possessing high magnetic permeability; George H. Smith Steel Casting Co., Milwaukee.

SPECIAL DEFIRUST RUSTLESS IRON; chromium 16 to 18, manganese under 0.5, carbon under 0.1 per cent and nickel a trace; an alloy resistant to abrasion; Rustless Iron Corp. of America, Baltimore, Md.

STANDARDALLOY; a chromium-nickel alloy (20 to 60 nickel, 16 to 25 per cent chromium); for heat-resisting purposes; Standard Alloy Co., Inc., Cleveland.

STELLITE; an abrasion-resisting alloy; cobalt 40 to 80, tungsten 0 to 25, chromium 20 to 35, and carbon 0.75 to 2.5 per cent; Haynes Stellite Co., Kokomo, Ind.

STERLING NIROSTA; a stainless resisting steel (carbon 0.15 and chromium 18.0 per cent) in strip, sheet, tube form and for articles to be hot forged or cold pressed; Firth-Sterling Steel Co., McKeesport, Pa.

STERLING STAINLESS STEELS, Types "A," "B," "T," "MG"; chromium steels with chromium from 12.50 in "T" to 19.00 per cent in "MG"; for cutlery, surgical and dental instruments, general machinery parts, etc.; Firth-Sterling Steel Co., McKeesport, Pa.

STOODITE; an abrasion-resisting alloy composed of chromium, iron and manganese; for tipping tools, Stoody Co., Whittier, Calif.

STRAUSS METAL; a tungsten carbide alloy, for high-speed cutting tools; Ludlum Steel Co., Watervliet, N. Y.

SUPERDIE; a high-carbon, high-chromium, oil and air-hardening alloy steel containing tungsten; resistant to excessive abrasion; for blanking, trimming, dies and burnishing tools; Columbia Tool Steel Co., Chicago Heights, Ill.

SWEETALOY; No. 16, a stainless iron for screw plugs, valves, etc.; No. 17, a high-chromium-nickel iron, acid resisting; No. 18, a high nickel-chromium iron, corrosion-resisting; No. 19, a high-chromium iron, abrasion resisting; No. 20 a high-nickel high-chromium iron, heat resisting; No. 21, a nickel and chrome alloy, heat resisting; No. 22, a high-chromium-nickel iron, acid resisting; Wm. J. Sweet Foundry Co., Inc., Irvington, N. J.

T

TANTIRON; a high-silicon iron alloy possessing corrosion-resisting qualities; Bethlehem Foundry & Machine Co., Bethlehem, Pa.

TEMPALLOY; heat-resisting steel; Duquesne Steel Foundry Co., Pittsburgh.

TOBIN BRONZE; a corrosion-resisting metal; for pump shafts, propeller blades, etc.; copper 60, zinc 39.25, tin 0.75 per cent; American Brass Co., Waterbury, Conn.

TONCAN; an iron alloyed with copper and molybdenum; corrosion resistant; Central Alloy Steel Corp., Massillon, O.

TROPHET A; a corrosive resisting alloy; nickel 80, chromium 20 per cent; Grade "C," an alloy in the form of bars, sheets and wire; nickel 60, chromium 12 per cent and iron; resistant to high temperatures and corrosion; Gilby Wire Co., Newark, N. J.

TUFALOY; an alloy cast steel; abrasion resisting; Fort Pitt Steel Casting Co., McKeesport, Pa.

U

ULTRADIE; a nondeforming die steel; carbon 2.35, chromium 13 per cent; Cyclops Steel Co., Titusville, Pa.

UNILOY; No. 1, noncorrosive, heat resisting to 1600 degrees Fahr. (chromium 18, nickel 8 per cent); No. 2, noncorrosive, heat resisting to 1800 degrees Fahr. (chromium 21, nickel 12 per cent); Cyclops Steel Co., Titusville, Pa.

UNILOY; No. 1409, a noncorrosive stainless iron (chromium 12.50, nickel 0.25 per cent); No. 1809, a noncorrosive high-chrome stainless iron (chromium 18, nickel 0.50 per cent); No. 2825, a noncorrosive iron heat resisting to 2000 degrees Fahr. (chromium 28, nickel 0.50 per cent); Cyclops Steel Co., Titusville, Pa.

UNIONALOY; an iron base alloy; for mill guides, tube mill plugs, hopper liners; resistant to abrasion; Union Steel Casting Co., Pittsburgh.

UNIVAN; an alloy cast steel; resistant to shock and stress; vanadium 0.16 minimum, phosphorous and sulphur 0.05 per cent maximum; for locomotive frames, wheel centers, crossheads; Union Steel Casting Co., Pittsburgh.

UTICA; a tungsten alloy tool steel; for press tools, shapers, taps, reamers, punches; Ludlum Steel Co., Watervliet, N. Y.

W

WANDO; an oil-hardening steel; carbon 0.95, manganese 1.05, chromium 0.50, tungsten 0.50 per cent; Cyclops Steel Co., Titusville, Pa.

WIDIA; a tungsten-carbide cutting material, Fried-Krupp, A. G., Essen, Germany, represented in United States by Thomas Prosser & Son, New York.

Z

ZORITE; nickel 35, iron 17, chromium 15, manganese 1.75, and carbon 0.5 per cent; resistant to abrasion and high temperatures; Michiana Products Corp., Michigan City, Ind.

pose in indicating trends in the distribution of alloy steel.

Examination of the analyses of consumption by industries over a period of years shows that the proportion of alloy steel purchased for the automotive industry has been about 75 per cent of the total output. This year, for the first time, it has dropped rather sharply to 61 per cent. The significance of this perhaps is not that less alloy steel is going into automobiles but that a larger part of the new production is finding its way to other industries.

The 1929 distribution reveals a marked increase in the percentage of output consumed by the oil, machine tool, agricultural and construction industries. This statistical evidence is supported by the well known tendency in these fields to look with greater favor upon alloy steels.

For instance, the requirements in the petroleum industry have been made so exacting by recent changes in methods of refining that for certain parts ordinary steels no longer can be used satisfactorily. High temperatures and pressures in cracking stills and other refinery equipment have necessitated the use of chromium-nickel alloy tubes and stainless steel plungers and valve parts for pumps. The trend in oil refinery practice, and in fact most of the chemical industries, is such that it may be predicted with certainty that these fields in the future will offer attractive markets for alloy steels.

Conditions in these industries call for steels that will resist heat, corrosion and in some instances abrasion. The new chrome irons and steels seem to meet these requirements satisfactorily, and while the chemical industries undoubtedly will take an increasing tonnage of these steels, producers are by no means confining their attention to these markets. They are expecting that these alloys, of which Enduro Nirosta KA2 is a well known example, will be used for automobile trim, elevator cages, interior building trim, exterior sheathing of towers and tall structures, and for many other applications where resistance to corrosion is the principal consideration.

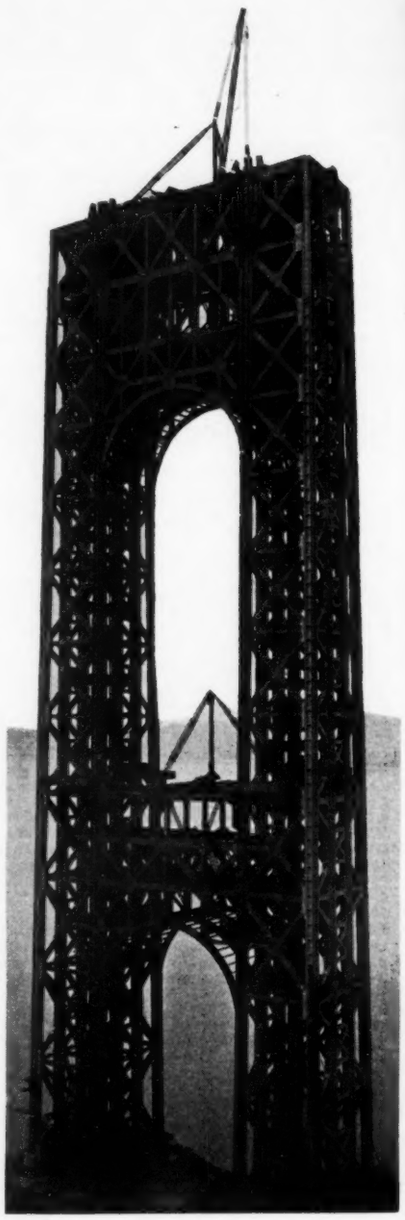
Apply High-Chromium Steels

Several noteworthy installations of this type of material have been or are being made. Ascoloy was employed to cover the sides of a pedestrian bridge connecting the Chicago Daily News building and the Chicago & Northwestern station. Enduro Nirosta is being used for exterior trim and for other purposes in the new Chrysler building in New York. Several brands of rustless steels and irons are being introduced in hub and radiator caps, wheel spokes, bumper ornaments and other parts of automobiles. These special irons and steels also have found an increasing acceptance for food containers, dental instruments, cutlery, etc.

The use of alloys in heavy structures is not new, high-strength steels of alloy composition having been introduced in bridges many years ago. However, the increased height of buildings and longer span of bridges are forcing engineers to consider alloy steels with renewed interest. Nickel steels have been employed in the chords and web members of stiffening trusses and in the eyebars of several bridge structures. Silicon steel to the amount of nearly 100,000 tons has been used in bridge construction. More than 30,000 tons of this material went into the towers and floor system of the Hudson river suspension bridge, now being completed.

One of the interesting results of the introduction of tungsten-carbide cutting materials has been the appreciable improvement in high-speed steels. C. E. MacQuigg, director, Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y., when speaking recently before the New York section of the American Institute of Mining and Metallurgical Engineers, estimated that 10,000 tons of high speed steel is being produced annually in the United States. Of this amount, 3000 tons is for drills, reamers, etc.; 2500 tons for hobs, mills and formed tools of similar type; 1500 tons for punches, disks, etc.; 2000 tons for lathe, planer, shaper and boring mill tools and 1000 tons for other purposes.

Rivalry in cutting tool materials has been intensified during the past year, but thus far the relative value of the various new offerings is undecided.



Over 30,000 tons of silicon steel is being used in the towers and floor system of the Hudson river bridge

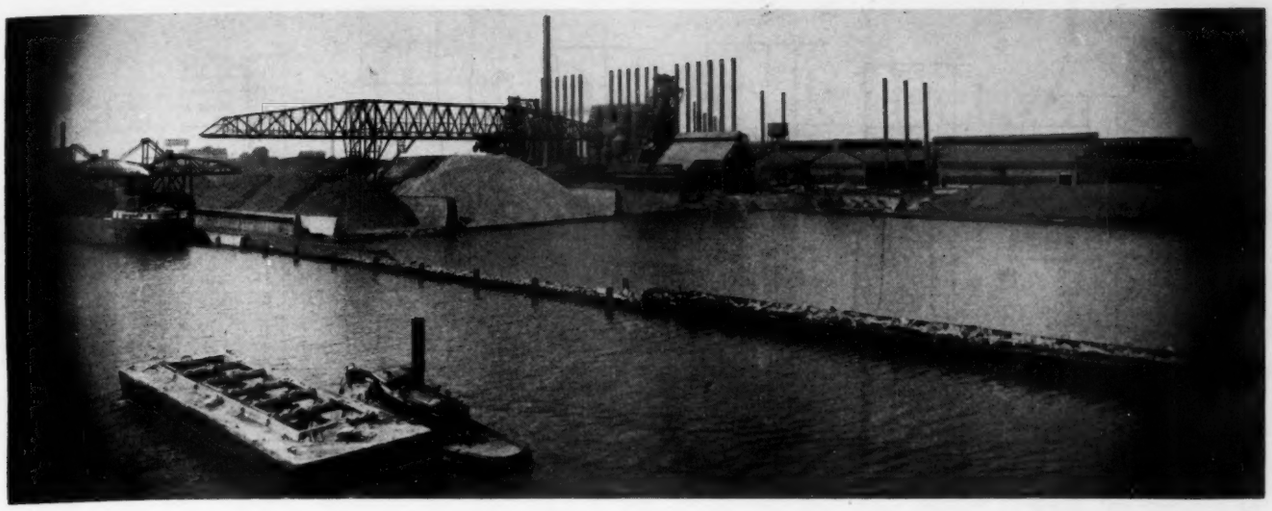
Tungsten-carbide undoubtedly has demonstrated its superiority for certain work, but it is too early to determine what will be its ultimate effect on the consumption of high speed steels.

Directory of Alloy Trade Names

IN VIEW of the heightened interest in alloy steels, IRON TRADE REVIEW *presents on pages* 16 *and* 17 *a directory of trade names reported by the principal producers. The list is admittedly incomplete, as the aim is to show the more recently introduced products rather than to offer a directory of all alloys, which space would prohibit.*

The introduction during the past few years of numerous special steels and metals, most of which are designated by brand names, has brought hundreds of inquiries to this office for information as to the character of the product and the name of the maker. It is hoped that the accompanying directory will be of assistance to prospective purchasers in identifying special steels.

THE EDITORS



Accelerated Progress Makes 1929 Notable Year in Engineering

By E. J. Ross

Associate Editor, Iron Trade Review

ENGINEERING achievements have been recorded with such frequency and regularity during the past few years that developments of transcending significance now are accepted as a matter of course. It is not surprising, therefore, that a number of important technical accomplishments which 10 years ago would have been hailed as revolutionary, in 1929 were calmly welcomed as ordinary grist from the now rapidly turning mill of science.

While it is possible to point to many noteworthy achievements in 1929, the year is characterized more by the acceleration of engineering progress than by the number or quality of new developments. For several years the importance of science as a vital factor in industrial advancement has been gaining recognition.

The result is that America has acquired an "engineering consciousness," which already is being manifested in the changed attitude of management toward scientific research and engineering activities. Industrial executives who in the past have been reluctant to authorize expenditures for scientific development, now are actively supporting it with every resource at their disposal. They realize that today leadership in technology is the most potent weapon against competition. Proof of this is furnished in abundance by the events of 1929. It is reflected in the unprecedented activity of steel companies in pooling, exchanging and licensing of patents. It also is manifested in the feverish intensity with which producers are introducing new alloy steels to meet the special requirements of industry. Again it is evident in the spirited rivalry of mill and furnace interests to remodel their equipment to keep abreast of the latest engineering refinements.

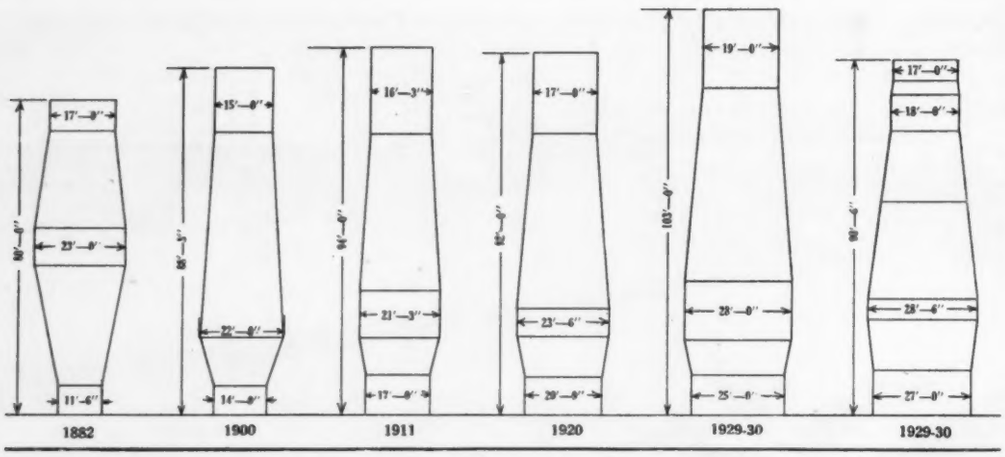
Outstanding among these many developments is the introduction of iron, steel and nonferrous alloys. The birth rate of new brands now is the highest in history.

Improvements in equipment are found all along the line. The 1000-ton blast furnaces has arrived. Refinement in open-hearth technic continues. Separate drives for each roll in blooming mills have been installed. Application of the continuous principle in rolling sheet and strip steel is being extended. Notable progress is being made in the design of auxiliary mill equipment.

Welding is entering a period of sound development. Riveting equipment is being refined to correspond more closely to the mass production idea. Nitriding still is the dominant topic in the field of heat treating, where improvement in temperature control and tendency toward greater use of continuous furnaces are outstanding features. Progress is reported in all branches of the foundry industry, particularly in gray iron, where the stimulus of organization is a strong factor in encouraging technical advancement. Introduction of alloy cast iron is gaining favor. Machine tool builders spurred on by the influence of the new tungsten-carbide tools are attacking the problems of rigidity, lubrication and power with renewed vigor. The hydraulic feed idea has gained more ground.

IN PRESENTING its third annual composite analysis of engineering progress in the steel and allied industries, IRON TRADE REVIEW *takes this opportunity to express its appreciation and to acknowledge its indebtedness to the country's leading engineers, metallurgists and operating officials whose contributed opinions have made possible the panorama of technical development appearing on the following pages.*

—THE EDITORS.



Lines of typical American blast furnaces showing important changes from 1882 *to* 1930

Operators Explore Possibilities in 1000-Ton Blast Furnace

CREDITED to the year just closed is the tendency of various blast furnace operators to enlarge existing stacks to consistently smelt 1000 tons or more pig iron a day. In step with this development has been the more profitable use of blast furnace gas for underfiring coke ovens, for melting open-hearth charges and for reheating steel in rolling mill departments. These contributions have involved changes in stack design, stockhouse and blowing equipment, gas cleaners, stoves and boilers.

In discussing the progress made in blast furnace industry, Arthur G. McKee, president, Arthur G. McKee & Co., Cleveland, suggests that top development has lagged behind hearth refinement and has been one cause of the periodically increased flue dust losses that have attended the large unit and much greater volume of blast which they have required. He sees another significant change in the increase of the difference between bell and stockline from the long customary figure of 2 feet to 2½ feet. He believes it is possible that the stockline diameter may be increased at a faster rate than the hearth diameter until they are more nearly equal.

Requires Larger Auxiliaries

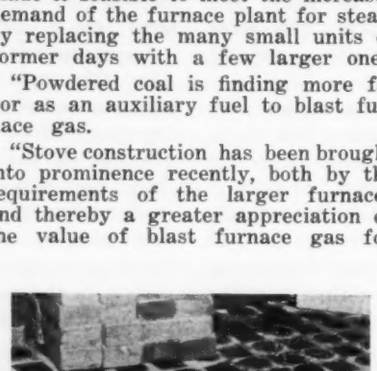
The 1000-ton furnace, Mr. McKee points out, will necessitate a corresponding increase of capacity in the furnace auxiliaries. "In general," he says, "it may be stated that the tendency in stockhouse construction definitely is more to central coke bins, preferably supplemented by weigh hoppers for coke weighing, double-compartment larry car and double skips of large capacity. Skip hoists and bell dumping rigs are larger and electrically operated.

"For blowing equipment, turboblowers have proven particularly well suited for the larger furnaces due to their highly efficient operation, and also to the small amount of floor space which they require. In a similar way modern large capacity boilers have made it feasible to meet the increased demand of the furnace plant for steam by replacing the many small units of former days with a few larger ones.

"Powdered coal is finding more favor as an auxiliary fuel to blast furnace gas.

"Stove construction has been brought into prominence recently, both by the requirements of the larger furnaces and thereby a greater appreciation of the value of blast furnace gas for other purposes. The one has made it imperative to secure greater blast heating capacity and the other has emphasized the importance of gas conservation through higher stove efficiency. Another reason for better stoves lies in the generally improved furnace practice, which has made higher blast temperature feasible.

"The past year has witnessed the inauguration in this country of underfiring coke ovens with blast furnace gas. Coke produced in ovens heated by blast furnace gas has proven to be of more uniform quality than when the same ovens were fired with coal gas, and the blast furnace practice is said to have been improved as a result of the change."



Interlocked type of checker tiles for blast furnace stoves. The checkers are supported by alloy steel grids

Bosh Angles Steeper

Important developments in blast furnace construction during 1929, as viewed by C. D. Rawstorne, contract engineer, Riter-Conley Co., Pittsburgh, include large-diameter stocklines, steeper angle of bosh, increased batter of inwall, a large increase in the number of plates above mantle for cooling and the comparatively small diameter of the large bell. In his opinion blast furnace stove efficiency has increased 40 to 50 per cent and more attention is being paid to obtain a much cleaner blast furnace gas by the use of disintegrators in order that the fuel may be used for underfiring coke ovens.

Commenting on recent development in the blast furnace field, F. H. Willcox, vice president, Freyn Engineering Co., Chicago, points out that blast furnace design and practice have not

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Open-Hearth Men Seek Better Gas Control and Larger Furnaces

CONTROL of combustion and the insulation of open-hearth furnaces recently have gained impetus because of the successful operation of several furnaces on which these theories have been tried to the fullest extent, is the opinion of L. F. Reinartz, assistant general superintendent, American Rolling Mill Co., Middletown, O. "Renewed interest is being taken in natural gas as an open-hearth fuel due to new sources of supply," declares Mr. Reinartz. "All steelmakers are concentrating on increasing the tons per hour of their furnaces by reducing delays, better furnace practice and care in the selection of raw materials."

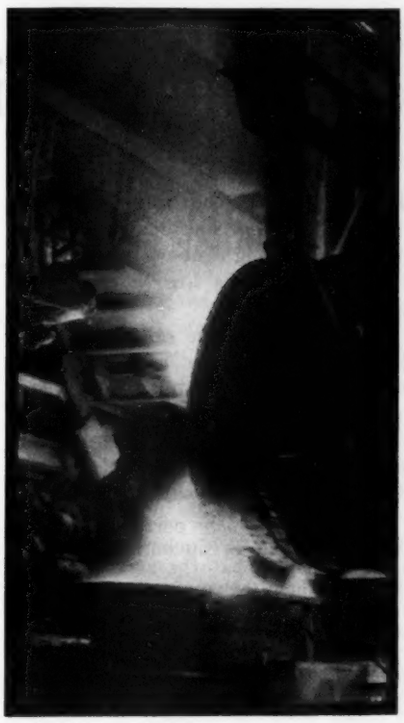
"We have noted a marked trend for more proper regulation and control of the flow of gases throughout the open-hearth system," writes W. P. Chandler chief engineer, furnace equipment department, Blaw-Knox Co., Pittsburgh. "In order to obtain proper flame control and proper furnace operation, open-hearth men are giving considerable attention to the distribution of the flow through the gas and air checkers. The need for proper valve equipment, therefore, has been accentuated."

"Valves have been made adjustable so as to make possible the proper distribution of the waste gases between these two checkers. In this manner," states Mr. Chandler, "the flow of air to the furnace can be adjusted to the highest temperature and in the proper proportion to the fuel flow. The use of proper control of the draft on the furnace and the ability to completely seal the furnace during periods of shutdown also has proven a decided advantage and resulted in material saving."

Control Gains Favor

C. H. Herty Jr., supervising metallurgist, metallurgical section, bureau of mines experiment station, Pittsburgh, states that "the greatest progress in open-hearth furnace design and practice during the past year has been the rapid strides made in combustion control period. The decreased fuel consumption, increased life of furnace and greater ease of operation makes this the outstanding advancement in steelmaking practice in 1929."

Two open-hearth furnaces were built last year in which the charges are melted by a mixture of blast furnace and coke oven gas, the mixture varying from 5 : 1 to 2.3 : 1. The thermal value of the gas is reported as 240 B.t.u.'s per pound of gas



burned. Approximately 25,014 tons of steel was tapped in 186 heats. The average charge for one month amounted to 143.6 tons and the average heat 134.8 tons. For a month's run the heats averaged 12.1 gross tons an hour. In the near future the company plans to use from 16 to 17 gallons of tar per ton of ingots produced depending on blast furnace gas to supply the remainder of the heat required to melt the charges.

Perhaps the most important advance in the development of open-hearth capacity has been in furnaces installed during the last few years, according to F. A. King, superintendent, open-hearth department, Weirton Steel Co., Weirton, W. Va., in speaking at a recent meeting of the American Iron and Steel institute. "Our experience," he said, "indicates a tendency to increase yield in the product of the larger furnaces. Oxidation in the deeper bath is not so extensive as in the shallower bath. Inasmuch as the depth of the bath is increased with larger furnaces, the hearth area of slag surface becomes less per ton of metal capacity. Therefore, for the same depth of slag blanket, less limestone is needed per ton, provided that there are sufficient basic elements to take up the acid components and preserve the proper basicity.

"The limestone used per ton of product is one of the primary considerations the deeper bath permits and even imposes the use of less flux. Limestone is of great significance from the standpoint of quality. This material is, of course, the major slag forming material and the slag is the vehicle of steel refining. Inasmuch as the depth of the bath is increased with larger furnaces the hearth area of slag surface becomes less per ton of metal capacity.

Oxidation Is Not Excessive

"It is no more difficult to keep the iron and manganese oxides normal in the slag over a deep bath," continued Mr. King, "and there is at least no more tendency to oxidation in the deep bath than in the shallow one; in fact, relatively less so, especially per ton of steel. It may be granted that over-oxidation is harder to correct in the deeper bath, but it is much less likely to occur and correction is almost certain to be imperfect.

"Not only coal consumption but repairs, overhead, and similar items, show progressive economy as the furnace size increases. Less bottom trouble has been found as the size or depth of the bath increases. With the deeper bath the bottom cleans better and is more easily kept in proper condition, and in actual practice the larger furnaces have given less bottom trouble.

"There is no question that there is a limit to the size of open-hearth furnaces, as there is to blast furnaces, but we believe open-hearth furnaces have not approached the limit in size; and to keep pace with the modern trend of all industries, furnaces will be built even larger than 350 tons which is the largest stationary open-hearth furnace in operation or projected."

New Applications of Electric Drive Interest Mill Engineers

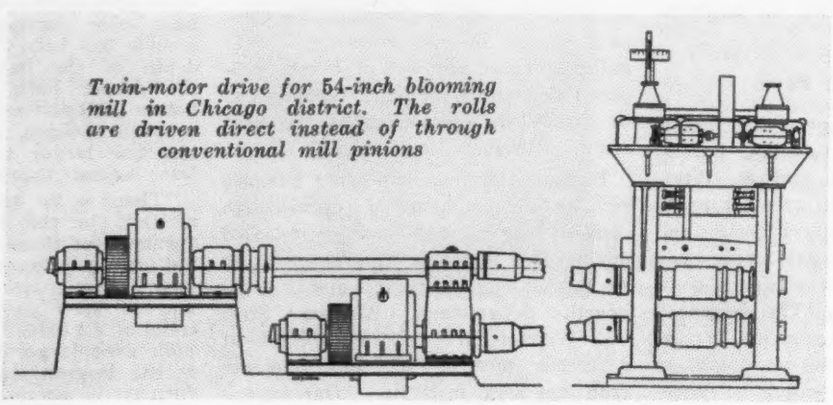
SEVERAL interesting phases of development were contributed by the rolling mill industry during the year just closed. A mill drive installed on a 36-inch blooming mill in the Wheeling district attracted attention because it was the first instance in this country in which separate reversing motors were used for driving the horizontal and vertical rolls. The installation also is the first reversing mill drive in the country having three generators in parallel.

Another unique advancement is the electric motor drive for a 54-inch reversing blooming mill in the Chicago district. The motor capacity is 10,000 horsepower, or 25 per cent more than yet has been applied to any single stand mill. The mill will be the first blooming installation where individual or twin-motor drive is used. In discussing this installation, R. H. Wright, steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., points out that in the twin-motor system of drive the conventional mill pinions are eliminated and the upper and lower rolls each are connected to a reversing motor. By mounting the mill and motors so the lower spindle has a permanent angle of approximately 2½ degrees, the upper spindle will operate at an angle of from 3 to 5 degrees below the horizontal when the rolls are together and at approximately the same angle above the horizontal when the rolls are set for maximum separation.

Development in the rolling mill field during the past year also included a new type 4-high "steckel" mill for rolling cold strip up to 18 inches wide. J. D. Wright, industrial engineering department, General Electric Co., Schenectady, N. Y., says:

"The rolls which perform the actual work of reducing the metal are not driven, but the strip is pulled through them by means of a motor-driven reel on which it is wound. One of these reels is placed at each side of the main roll stand and the strip is passed back and forth through the rolls, being wound on one reel as it unwinds from the other. It is essential that a certain amount of tension be maintained in the strip between the roll stand and the reel from which it is being unwound. To obtain this result the motor on the unwinding reel is caused to act as a generator, to give a braking action.

R. J. Wean, president, Wean Engineering Co., Warren, O. mentions a number of improvements made in sheet and tin mill auxiliary equipment, including continuous pack heating and annealing furnaces, cold roll packing machinery, roller and stretcher levelers, etc. He states: "Continuous pack heating furnaces for serving finishing mills have been installed in large numbers this year. The units have a chain-type conveying mechanism with special developed carrying members. Outstanding improvements in the design of double annealing furnaces include the installation of improved raw gas burners supplied with preheated air through forced draft blowers operated in conjunction with re-designed combustion chambers under sufficient pressure to insure uniform temperature throughout the entire furnace area. Automatic temperature control has resulted in satisfactory black annealing without the attendant sticking heretofore accepted as unavoidable. The development of cold roll packing machinery has inaugurated practically perfect piling following cold rolling. In the tinning department substantial increases in tinning speeds seem likely in the near future. Experimental units have been operated at speeds nearly double the accepted standard of 300 inches a minute."



Twin-motor drive for 54-inch blooming mill in Chicago district. The rolls are driven direct instead of through conventional mill pinions

Foundries Turning Efforts Toward Improvement in Quality

CENTERING attention upon metallurgical fundamentals, foundry engineers, with production demands satiated for the while, have sought improvements in quality of output rather than quantity. High-test cast iron, malleable iron produced under the short-cycle annealing process, and other varieties of castings with greatly improved physical properties are testimonials to this trend.

Concerning the high-test cast iron, Dr. Richard Moldenke, Watchung, N. J., points out that the production of this material is increasing in that some of the more important foundries have found it possible to replace many steel castings with this quality of cast iron. One works in question does so at the rate of 15 tons daily, in addition to regular gray iron work.

Contrasting former and present methods, John W. Bolton, chief metallurgist, Lunkenheimer Co., Cincinnati, calls to mind how the foundryman formerly controlled his mix by silicon content while now the progressive operator is giving attention to carbon content as well as the effect of section size, melting temperature, combustibility of fuel and other factors hitherto little noticed. Mr. Bolton sees a need for the classification of gray iron alloys. In his own words: "Any engineer can pick up a handbook and find about what can be expected from a 1045 or 3130 steel; but what grade of gray iron shall he use, and how shall he go about specifying it? The recent symposium of the American Society for Testing Materials was a step in the right direction. Gray iron is a worthy engineering material but the proper grade must be selected for the purpose intended."

Institute Aids Industry

R. S. MacPherran, chief chemist, Allis-Chalmers Mfg. Co., Milwaukee, concurs in opinions expressed on high-test cast iron and cites the instance of a 40-ton casting manufactured from this quality iron by his company.

Support from members of the industry accorded the Gray Iron institute during the past year has been a signal recognition of the desire on the part of gray iron foundrymen to elevate their own condition and improve their service to the public through unified co-operative effort, according to Arthur J. Tuscany, manager of the institute, and Walter L. Seelbach, president of the group and associated with the Forest City-Walworth Run Foundries Co., Cleveland. The Gray Iron institute has determined a plan for establishing specifications or recommended practices for various types of gray iron castings for different service conditions, a step which should fit in with the need for such a classification as recently pointed out by Mr. Bolton.

H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, comments on the progress of the malleable iron industry as follows:

"Attempts to shorten the annealing cycle have reached a commercial stage and at least one large installation is in progress on a fully operating basis, this in addition to the installations made by the protagonists of electrical annealing for demonstration purposes. The Malleable Iron Research institute through its consulting engineer, has given attention to this and related problems of the freezing conditions of white cast iron with interesting results and the same problem has been attacked also by individual workers.

"Through the efforts of the institute and its consulting engineer and also

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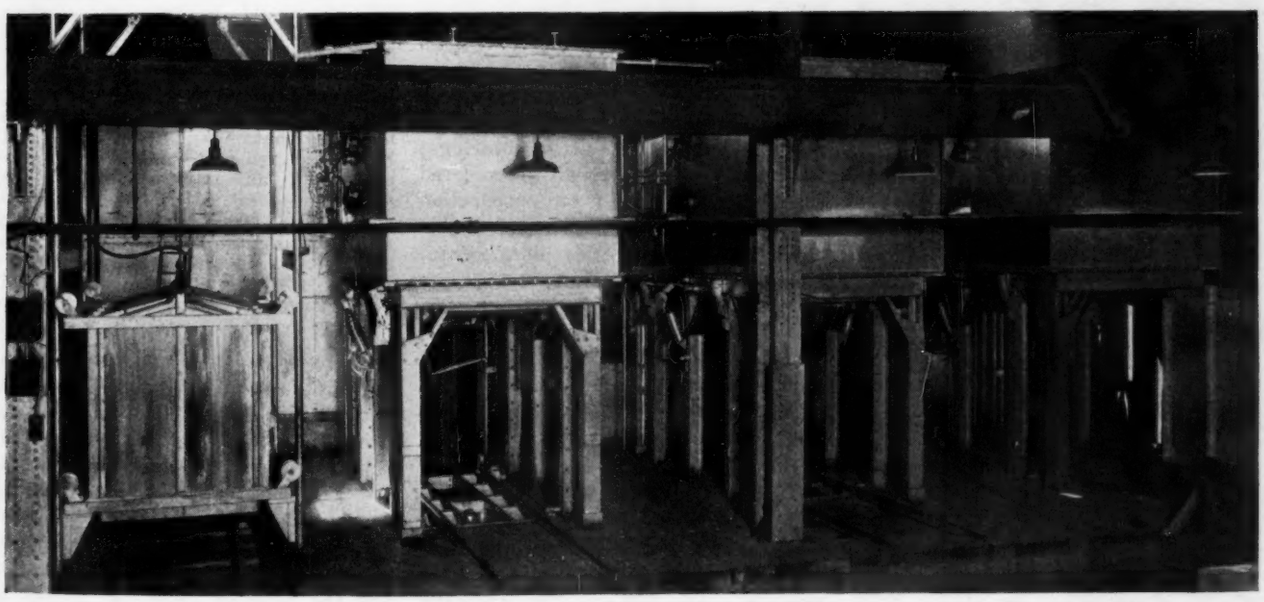


A short annealing cycle for malleable castings was a notable development of 1929. *Above are shown three electric overhead-type units built to anneal the castings in* 24 *to* 30 *hours*

Users Want Automaticity, Rigidity in New Machine Tools

OUTSTANDING in a year in which machine tool production rose to record heights were four major trends. First was the increasing use of automatic features on machines, brought about by the continual striving to reduce labor on the part of the operator, increase production and turn out a product which is unvarying in accuracy. Second was the further development of a design embodying increased rigidity, a characteristic necessitated by the use of tungsten carbide tools and the attendant higher speeds. Third was the application of centralized forced-feed lubrication systems, doing away with the old types of hand oilers. This is a development which has been noted in machine tool design for some years, but increasing importance was attached to it in 1929. Fourth was the further development and use of the antifriction bearing.

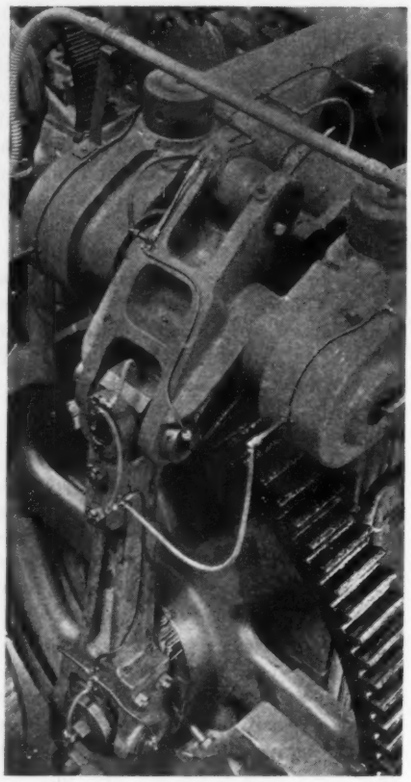
Automatic Feature Prominent

With regard to the increasing use of the automatic feature, W. P. Michell, International Motor Co., Allentown, Pa., has the following to say:

"I believe the only function of the operator of the modern machine tool should be to load, start and unload the machine. The hand-operated sensitive drill will give way to hydraulic or friction feed machines with rapid traverse to and from the work. The ordinary turret lathe will be replaced by the semiautomatic; this change, it seems to me, has been too long in coming. Replacement of existing equipment must be considered, each case on its own merits; but in tooling for new jobs or additional capacity, the final costs usually will indicate the semiautomatic machine.

"The drill press will be equipped to traverse rapidly to the work and feed through automatically, as well as to trip and raise the spindle as at present. The new cylindrical grinders are now in line with this trend. The operator loads the work and throws the starting lever; the headstock starts and stops; the flow of grinding compound starts and stops; and the wheel traverses rapidly to the work, grinds it to size and returns, all automatically.

"Milling machines of certain types are equipped with these automatic features; but nothing of the sort is available on the hand miller types where the saving in time would be great."



Centralized forced-feed lubrication systems are progressive trends

Continuing, Mr. Michell mentions some of the essentials which his company demands in machine tools. A strong preference is expressed for the machine having antifriction bearings; hardened steel ways are considered absolutely essential on production lathes both of the turret and double cross slide types. Machines which eliminate hand traversing, such as the hydraulic power traverse disk grinder, and thread millers, tapping machines, bar pointing machines, centering machines and bolt threaders—all equipped with mechanical traverse—are considered above competition.

The outstanding achievement of 1929, in the opinion of J. B. Bolender, tool supervisor, Warner Gear Co., Muncie, Ind., was the hydraulic gear shift on a standard type of milling machine. Another was the automatic cut-off saw, which automatically unclamps, feeds the bar stock, clamps again and saws the part off, going through the cycle completely automatic until the bars are sawed up to specified lengths. Mr. Bolender continues:

"Trend in machine tool design is markedly toward the frictionless-type bearing, including both ball and taper roller types. In some instances the tapered roller bearing is found to be superior to the ball bearing while in other instances the reverse is true. In a good many cases it is necessary to perform tests to determine the more desirable type of bearing. Some builders of machine tools have solved successfully the lubrication problem by applying forced-feed lubrication to all bearings possible. I believe it is only a matter of time until practically all machine tools will be equipped with frictionless-type bearings."

Look to Lubrication

C. R. Guinee, plant manager, Spicer Mfg. Corp., Pottstown, Pa., notes a trend toward larger spindles with ball bearings and considers it a move in the right direction. Central oiling systems also impressed Mr. Guinee as a progressive trend in design. Concerning them he has the following to say:

"While attending the recent machinery show in Cleveland I noticed a number of machines with oil holes which would require a half hour's time on the part of the operator to fill. I would hesitate to purchase such machines because of the loss of operating time for lubrication, and because I feel that their designers are ten years behind the times. Recently the Spicer Mfg. Corp. purchased a machine that has 146 oil holes, all lubricated from a central high-pressure unit, and it requires but two minutes to oil all bearings in the machine. I feel that it is entirely due to this that we have no bearing troubles. Machine tool designers should give this phase of their business careful consideration on the drawing board."

Summing up the situation in general, the superintendent of the tools and equipment division of a large motor car manufacturer states that not only during the last year but for the last several years the trend in design appears to have been toward greater productive output from machines, improvements in lubrication and the adoption of higher speeds to use advantageously the newer tungsten carbide tools. These speeds in turn

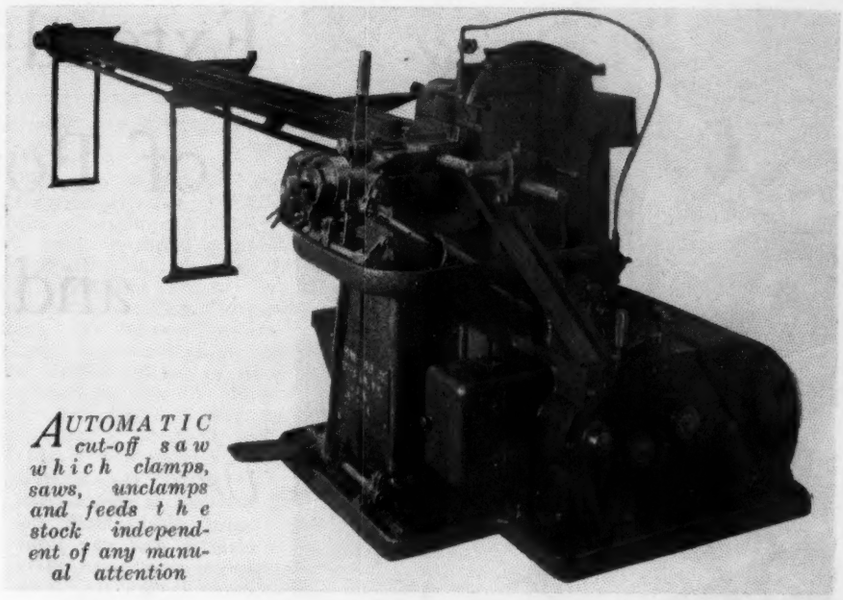
necessitate more than ever antifriction bearings. The fact that tungsten carbide tools have generally come to be recognized as effective means of high-speed production and heavy-duty work, undoubtedly will compel a more general use of antifriction bearings on most types of machine tools. In order to use tungsten carbide tools advantageously, machines necessarily must be speeded up and this can be done, in the majority of cases, only with antifriction bearings.

Obviously improvements in the quality and selection of these frictionless bearings must go hand-in-hand with their more general use. Certain machines such as heavy-duty cylindrical grinders at present do not adapt themselves readily to the use of these bearings, but undoubtedly even on this type of machine the problem will be worked out soon.

Some of the automatic controls and automatic work handling devices which have been worked out within the last year or two are pernaps the greatest recent contribution toward better machine tool design. Where devices of this kind replace or reduce substantially the operator's time at the machine, their labor saving value justifies their cost many times over.

Hydraulic Feeds Favored

Hydraulic feeds, the adaptation of which has been increasing for several years on the newer machine tools, although occasionally troublesome when first introdued, now have reached the point where they help to eliminate many of the troubles that were inherent in the old gear and cam types of feeds. Of course, mechanical feeds still have their advantages over hydraulic feeds, but the decreasing number of such exceptions becomes evident to the student of machine tool design.



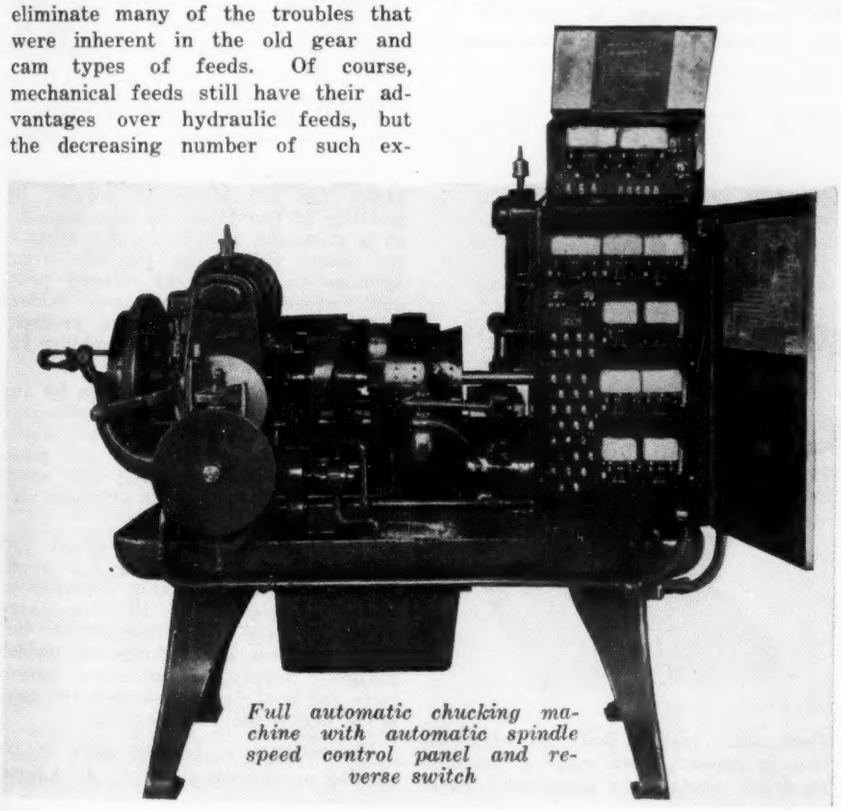
AUTOMATIC cut-off saw which clamps, saws, unclamps and feeds the stock independent of any manual attention

Solving of the lubrication problem on machine tools has been accomplished by the centralized force-feed lubrication system, in the opinion of J. R. Weaver, superintendent of the manufacturing equipment department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Looking back over achievements of 1929, Mr. Weaver says in part:

"The outstanding accomplishment of the year, I believe, is the fact that it is possible to obtain more production from present-day machine tools than has been possible in the past. This is due to the use of ball and roller bearings where possible, more rugged machines and centralization of controls.

"The trend in machine tool users' plants of having one operator control several machines has induced requirements for automatic and semiautomatic machines. There is no question but what a better product in less time is obtained from a machine tool which can be set up for an operation and allowed to go through its various cycles without attention."

R. S. Dyson, special engineer, Link-Belt Co., Indianapolis, considers that a signal development in the industry has been the "promotion of better designed multiple-spindle machines of all kinds, both in standard and special equipment,"



Full automatic chucking machine with automatic spindle speed control panel and reverse switch

Economy Is Demanded

W. D. Conover, advertising manager, Toledo Scale Co., Toledo, O., presents an interesting viewpoint which deals with the effect of the mental attitude of factory managers, rather than the more material aspects of design. He states in part:

"The new attitude lays emphasis on 100 per cent economy in manufacture. Plant managers today are intent on obtaining a pound of finished product for every pound of raw material used. Competition from other manufacturers plus the anxiety to show a good balance sheet compels every far-sighted leader to make every efficient economy possible in his operations."

To arrive at a final consensus of opinion, it appears that progress made in the development of automatic machines impresses many designers and operators as outstanding for the past year. This, of course, is a further step in the mechanization of industry, a trend which has often been deplored as a creator of unemployment by releasing the hands of both skilled and unskilled labor.

Extend Applications of Both Welding and Riveting

USING the electric arc to weld structural steel. Both the electric and gas processes were used more extensively for this work in 1929

WELDING and riveting, the principal methods of joining metal, both have enjoyed progress in 1929. Welding, the newer process, has survived its growing pains and is becoming better established in public confidence. This is particularly true in the structural field in which skepticism always has been expressed. Sixty-eight cities in the United States have made provision to permit structural welding under specified conditions. One 300-ton mill-type building was fabricated entirely by gas welding during the year and details are worked out for additional mill-type and multi-story buildings. A structural welding code prepared by the American Welding society has proved a stimulating influence. Notable achievement is being made in boiler welding and nondestructive testing of welds on a production basis seems but a step away. The shipbuilding industry is finding wider application for welding, as are fabricators of machinery. Welding technique, higher quality electrodes and improved equipment have constituted important factors in progress of 1929. Unprecedented activity in the automotive and aircraft fields also accounted for wider employment of welding. This process of fabrication is winning greater favor from automobile makers and the tendency likely will increase. In 1928 airplane production was 4346 and the total in 1929 is estimated as over 7500. Practically all planes built today require much welding in their construction and the amount is certain to increase as more planes are made and design continues toward all-metal construction.

At the same time, improvement has been made in riveted joints and new riveting machinery has reduced costs. Cold riveting offers considerable promise for the future.

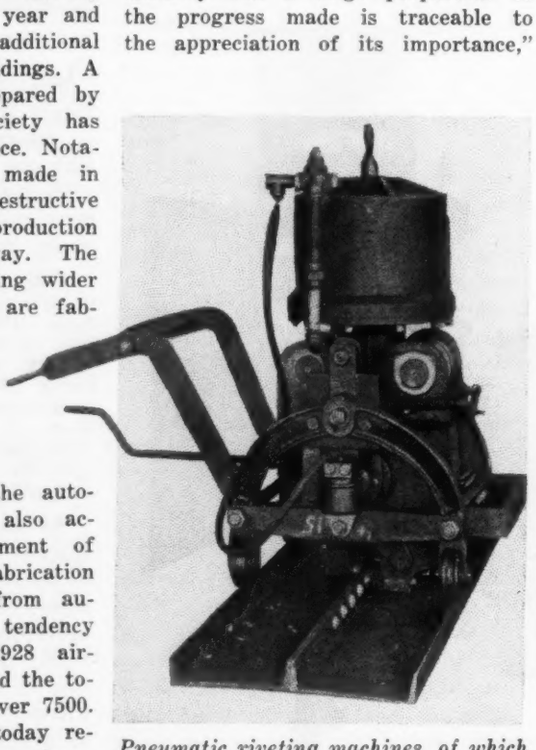
Research Becomes Important

"In hardly any other industry is research, both pure and applied, more diligently fostered than in the welding industry and a large proportion of the progress made is traceable to the appreciation of its importance," says H. H. Moss, engineer, development section, Linde Air Products Co., New York. "New problems, as they arise, are constantly being met by well-equipped and well-staffed research laboratories supported by the industry."

Similar views are expressed by F. T. Llewellyn, engineer, United States Steel Corp., New York, and president of the American Welding society, who adds:

"An outstanding development is the growing practice of large manufacturing companies to organize welding departments whose function is to co-operate in the proper application of welding to their specific problems of production as well as repair. Good progress is being made in the development of tests and the use of the stethoscope promises to remove the question of practical soundness from the laboratory and place it on a parity with the rivet inspector's hammer. More data are needed on unit resistance to impact and fatigue.

"Welding technique will improve automatically with its wider use. Several major improvements are being developed which should be available in 1930."



Pneumatic riveting machines, of which this is typical, have made it possible to drive rivets on a production basis

Eric H. Ewertz, consulting engineer, New York, contributes the following:

"Construction of unfired vessels or tanks for all kinds of service by welding of the joints is now accepted as a standard, and new rules adopted for codes will make possible great advance in welding of unfired pressure vessels. Low-pressure boilers are being welded and some progress has been made for use of welding for higher-pressure boilers.

"Piping is extensively made by the several kinds of welding processes from pipes as small as 1-inch diameter up to water, oil and gas pipes some 7 feet diameter, and field welding of piping has made a remarkable advance during this year.

"The conservative ship owner and builder is ever increasing the application of welding in ship construction and 9 barges up to 1000-ton cargo capacity have been completed this year, the first ones of the all welded design. Nearly all of these barges have had considerable service and have stood up to the requirements."

Nondestructive testing also is regarded as important by C. A. Adams,

Harvard university, Cambridge, Mass., for he says:

"There have been developed during the past year several methods for the nondestructive test or examination of welded structures which are bound to prove of great service in connection with certain important applications of welding to industry. These methods are, briefly: Stethoscope, X-ray, and two electromagnetic methods. Each of these methods has its particular field where it is most readily applied and most effective, but taken together they constitute a very important asset to the welding industry."

The greatest achievement in the welding field during the year 1929 has been in the electric arc welding of oil and gas lines, according to Robert E. Kinkead, consulting engineer in arc welding, Cleveland. Several thousand miles have been welded and the fact that all of these welds must be pressure tight and must have tensile strength closely approaching that of the parent metal of the pipe shows that an engineering achievement of considerable magnitude has been made.

Still Seek Uniformity

According to Mr. Kinkead, the greatest problem yet unsolved is how to enable the ordinary user of the welding processes to produce uniformly high-quality welds. He says:

"Little progress has been shown in the direction of developing commercially practicable tests for welds. The solution to this problem has taken a different turn and we are now utilizing procedure control and laboratory investigations to eliminate the possibility of producing bad welds rather than spending much time or money developing a method of finding the bad welds after they are produced. The term "procedure control" is used to describe the methods employed to eliminate the possibility of making a bad weld.

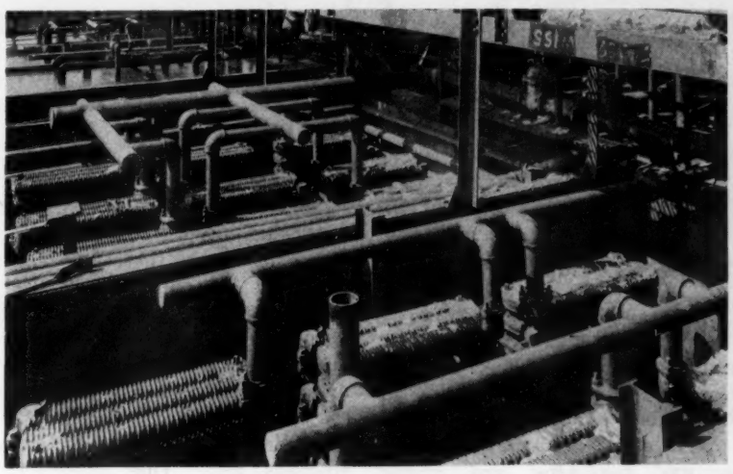
"The prospect of lighter production schedules in 1930 will undoubtedly bring out a number of improvements in equipment and process which have not heretofore been offered to the public. In fact it is well known that several revolutionary processes are in the final stages of development.

"The year 1929 marked the greatest user acceptance of welding in place of other fastening methods. The continued growth and rapid expansion of the welding industry was never before assured by such a wide-spread acceptance by the general public of welded joints."

The field of welding application has materially widened and a considerable amount of structural and pressure vessel work is being undertaken wherein the failure of a welded joint would mean the destruction of property and possible the loss of life, says James W. Owens, director of welding, Newport News Shipbuilding & Dry Dock Co., Newport News, Va. Concerning wider uses of welding in shipbuilding, Mr. Owens states:

"At the Newport News shipyard, all condensers for merchant and naval ships are now completely welded and we have recently completely welded the shaft alley bulkheads for two 508-foot merchant ships. We are also completely welding the masts of these ships. As these ships are among the largest merchant ships constructed in the United States to date and these applications are the first undertaken for such ships, it can be seen that considerable progress has been made in the application of welding to ship construction.

"The greatest problem yet unsolved is our inability to obtain a commercial electrode for metal arc welding with which sound ductile welds can be produced, not only in the flat position, but in the vertical and overhead positions. When it is considered that it is not always possible to eliminate vertical and overhead welding, the need of such an electrode is obvious."



Refinery plants are utilizing welding more and more in the construction of stills, condensers and piping

Proving by application and field trials the practicability and economic soundness of the process of fabricating machine structures by the use of standard shapes and plates joined by the electric arc process of welding, impressed A. R. Allard, works department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., as the most notable engineering accomplishment of the year. He states:

"The ratio of expansion in the use of the above method is probably not equaled, for a similar period, by the history of any other process of casting, forming and joining of metals. This expansion was not attended, insofar as I know, by a single weld failure in a major application. The analysis of design, the calculation of working stresses, the permissible loading of the weld metal joint, and the measuring of residual stresses require merely the application of already well known principles of engineering practice. The surprising results obtained were made possible by sound, conservative engineering practice, with nothing left to guess-work. Still greater accomplishments and economies lie ahead and await only two developments before becoming fact."

Head Welds Automatically

A. M. Candy, engineer, arc welding engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., finds the outstanding development in the arc welding field to be the new automatic welding head developed by his company. The feature of this head is that the speed of the motor which drives the welding wire is continually controlled by the arc conditions such that the welding wire is always fed at exactly the right rate as determined by the fusion of the electrode. This speed control is perfectly continuous and will automatically vary itself over a sufficiently wide range to not only take care of ordinary changes in the arc circuit itself but also to take care of relatively wide changes, such as appreciable change in current adjustments over wide limits and also changes in sizes of welding wire which also necessitate changes in the current. The control circuit eliminates the necessity for control relays, clutching or ratcheting devises. The machine will weld automatically under conditions previously unheard of.

Application of arc welding to structural work proved impressive to L. S. Thurston, industrial department, General Electric Co., Schenectady, N. Y., who pointed out that the number of structures erected by the method in

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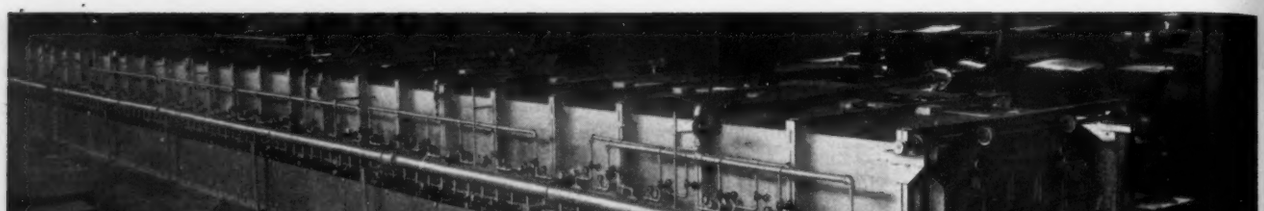


A continuous and automatic gas-fired furnace for normalizing steel sheets

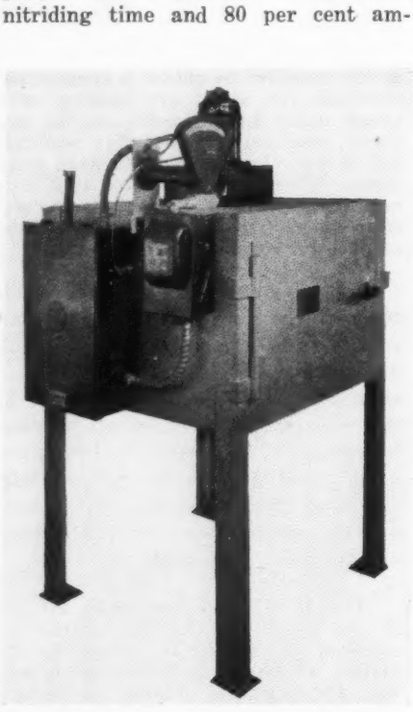
Furnace Improvement Is Greatest Need in Heat Treatment

THE nitriding process for hardening steel again stands as the year's most notable achievement in the heat treating field. This new method came to the forefront in 1928, but 1929 witnessed wider-spread interest and a more general adoption for commercial work. Research was pursued by many organizations, the investigations establishing valuable facts as to steels best suited for ammonia gas hardening and proper manipulation of equipment. Numerous organizations installed nitriding furnaces. A nitriding symposium continuing through a whole day of the American Society for Steel Treating annual convention attracted record-breaking attendance and gave testimony of the increasing interest in the subject.

Best Fuels Selected

Probably second in importance during 1929 was the development in heat treating furnaces. An effort was made to control temperatures more accurately, also to effect better regulation of heating chamber atmospheres. The tendency toward automatic continuous types of furnaces was more pronounced than ever and the question of fuel selection turned from one of severe competition to one of choosing the most efficient under given conditions.

Numerous metallurgical authorities have commented upon heat treating progress of the year. Prof. Bradley Stoughton, head of the department of metallurgy, Lehigh university, Bethlehem, Pa., states that while nitriding and increasing use of chrome-molybdenum steel for aircraft construction are developments rather than innovations, nevertheless very rapid developments in these two fields are the most important events in 1929. Prof. H. M. Boylston, head of the department of mining and metallurgy, Case School of Applied Science, Cleveland, names as outstanding developments the nitriding process and increased manufacture and use of low-carbon stainless iron. One important company now is getting in 20 hours nitriding time and 80 per cent ammonia dissociation results equal to those derived in the former 90-hour period and a 30 per cent dissociation.



A small electric furnace for nitriding or high-temperature air drawing. An agitating fan constantly circulates the heated air around the work

Professor Boylston also notes a continued trend toward larger electrically-heated furnaces as well as electric units of all sizes equipped for automatic control and automatic quenching. On the subject of temperature control, Professor Stoughton says:

"I believe that control of temperature in heat treating is susceptible to still further improvement. Experience in our laboratory with the furnace which indicates at one and the same time both the temperature and the magnetic force in the member being treated indicates this to be a great improvement over previous methods. Pyrometrical control automatic electric furnaces are developing to the point where they are giving marvelous results in uniformity of temperature, but no pyrometrical method alone seems to equal the magnetic method in determining the exact point for quenching or annealing treatments.

Critical Points Overlooked

"It seems to me that the greatest unsolved problem is a more delicate method for determining critical points in some of the alloy steels, because many expert observers and investigators publish researches in which these points are overlooked when they are not sharp. While this is a fundamental question very much in the realm of pure science, it seems to have a more practical application than any other unsolved problem."

After listing nitriding of steel as the most interesting development of the year, H. Bornstein, testing and research laboratories, Deere & Co., Moline, Ill., discusses furnace design

and control and progress in heat treating cast iron. He says:

"The trend in furnace design has been toward continuous furnaces with closer control of temperature. Furnaces are being insulated better and there is an increase in the use of gas and electricity for heating purposes. In the carburizing field, the counterflow type of furnace is coming into general use for production work. Control of temperature in furnaces is susceptible to greater refinement. The rapid circulation of furnace atmosphere is one means being taken to obtain temperature uniformity.

"Considerable work is being done on the heat treatment of cast iron. Large quantities of castings are now being heat treated to prevent distortion after machining and also to render the castings machinable. Some work has been done on the heat treatment of cast iron to improve physical properites."

J. H. G. Williams, metallurgical engineer, Henry Souther Engineering Co., Hartford, Conn., speaks at length on furnaces as follows:

"For years the trend has been to depend upon the furnace and not upon the man for heat treating operations. Today special-purpose furnaces are a fact; temperature control is an actuality; automatic devices are reliable and dependable.

"The year 1929 witnessed the application on a commercial basis of devices for the control of furnace atmosphere. Electric furnace, as well as fuel furnace manufacturers now claim as points of superiority means of modifying the furnace atmospheres chemically to meet the necessities of the treatments involved. Compelling necessity has brought this subject to the forefront and from now on the control of this variable will be increasingly successful.

"Furnace design no longer is confined to the conventional box or general-purpose type. By massing pieces within certain ranges of size and composition, production is increased to a point justifying the use of a furnace of special design with increased efficiency in fuel, labor and quality.

Closer Control Probable

"Temperature control is within as small a range as practical considerations require (plus or minus 10 degrees), nevertheless it may be and, in all probability, eventually will be more closely correlated with other features of furnace control such as the opening and closing of doors, the automatic lighting of gas curtains, and also linked with atmospheric control.

"Recognition of the fact that circumstances and local conditions determine whether to use electricity, gas or oil as a source of heat appears to be gaining ground."

The short-cycle anneal for malleable castings stands out as an interesting development of 1929 to H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland. During the year the General Electric Co., installed in its works at Erie, Pa., three electric furnaces which on a manufacturing basis anneal the castings in an average time of 28 hours. One important malleable founder purchased equipment for the same purpose from the Industrial Furnace Co., Buffalo.

Commenting upon this development, Mr. Schwartz says:

"To my mind the essence of what these two furnaces accomplish is merely a rapid and accurate control of furnace temperature, a problem which seems to have been better solved in these units than in other furnaces of acceptable design. Further improvement in this direction, however, will be desirable.

"From what I know of heat treating problems in the steel industry it seems to me that the major question to be solved by furnace designers is an improvement in the uniformity of temperature of large objects passing through furnaces of the continuous type. My experience with steel heat treating is, of course, primarily with parts much heavier than those in automotive plants where the greatest improvement in heat treating equipment has been made.

"It may be that this problem has been solved so far as the treatment of small parts is concerned. It is still, however, difficult to heat treat large units by continuous operations with any assurance of uniformity of temperature throughout."

One of the interesting small furnaces introduced during the year for nitriding or high-temperature drawing incorporated a motor-driven agitating fan to provide a constant circulation of air around the work, thus permitting a production practically double that obtained from a still-air furnace of similar size. This furnace is heated by electricity and is suitable for operation up to 1250 degrees Fahr.

Exploring Possibilities in 1000-Ton Stack

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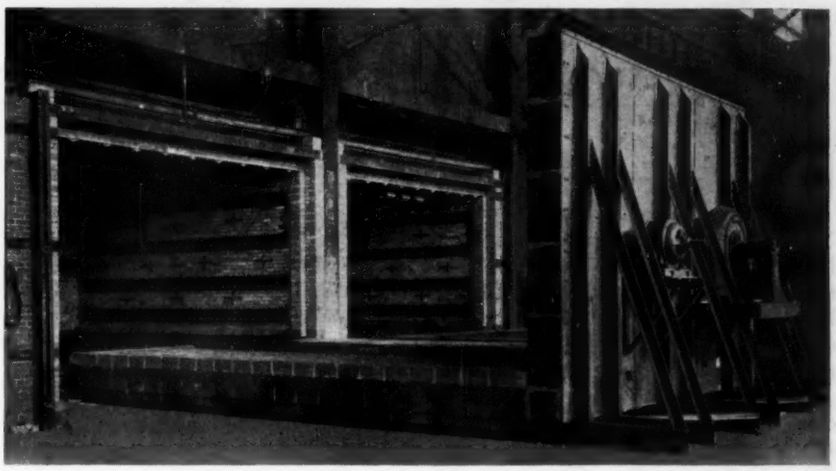
exhibited any noteworthy deviation from the past tendency toward wider hearths and increased tonnage. Wider stocklines have indicated, however, a probability of better relative rating of wide hearth construction. He comments as follows:

"More striking and novel advance is apparent in actual use of blast furnace gas for purposes other than stoves and boilers. The advantages are established definitely, both in lower cost of fuel application and in fuel saving proper. A corollary to this advance is the use of better stoves and disintegrator gas cleaning.

"Tendencies may be noted toward wider use of inwall cooling plates, refined means of regulation and observation of furnace and auxiliary equipment and to transportation economies. There is a tremendously increasing appreciation of the present day values of ore reserve. More and more interest and work is being given beneficiation and utilization of low-grade ores."



An electric car-type furnace used to anneal steel castings

The advancement of safety at blast furnaces during 1929 reached such high peaks of no loss-time accident that this accomplishment by management and men marks one of the great attainments in blast furnace practice, states R. H. Sweetser, assistant to vice president, American Rolling Mill Co., Columbus, O. He writes:

"A safe blast furnace plant is clean and efficient; the cost of cleanliness is less than the cost of compensation. Safety and efficient blast furnace practice go hand in hand as shown by the record of the Carrie blast furnace of the Carnegie Steel Co. That plant with approximately 850 men per day operated 238 days without a lost-time accident or a total of 1,772,682 man hours."

Enameling Industry Solves Problem of Continuous Burning

MANUFACTURERS constantly are demanding better surfaces on metal products. This challenge is being met with improved methods and equipment in the finishing departments, which embrace the operations of pickling, galvanizing, enameling and polishing.

"Advancement in the enameling industry last year is noteworthy," states R. A. Weaver, president, the Ferro Enamel Supply Co., Cleveland, "in that continuous enamelware burning was accomplished in this country for the first time. A year ago continuous furnaces for stove-plate work had not been developed to a point where operation was satisfactory; since then this type unit for stove-plate work, refrigerators, signs, table tops, etc., has been placed in successful operation. This year the enameling industry is faced with the problem of developing continuous automatic spraying and dipping machinery in order that all operations will be continuous and proportionately cost reducing. A continuous type electric furnace for burning vitreous enamels on kitchenware was employed in 1929 for the first time," reports Mr. Weaver. "The coated stock is conveyed in and out of the firing chamber through the same end. Heat is supplied through nickel-chrome ribbons mounted on the sidewalls, the temperature being controlled automatically. The work in transit travels 12 feet a minute when burning a 3-coat job. The quality of work is said to be much improved because of the close temperature control and the absence of smoke and gases."

Continuous Burning Successful

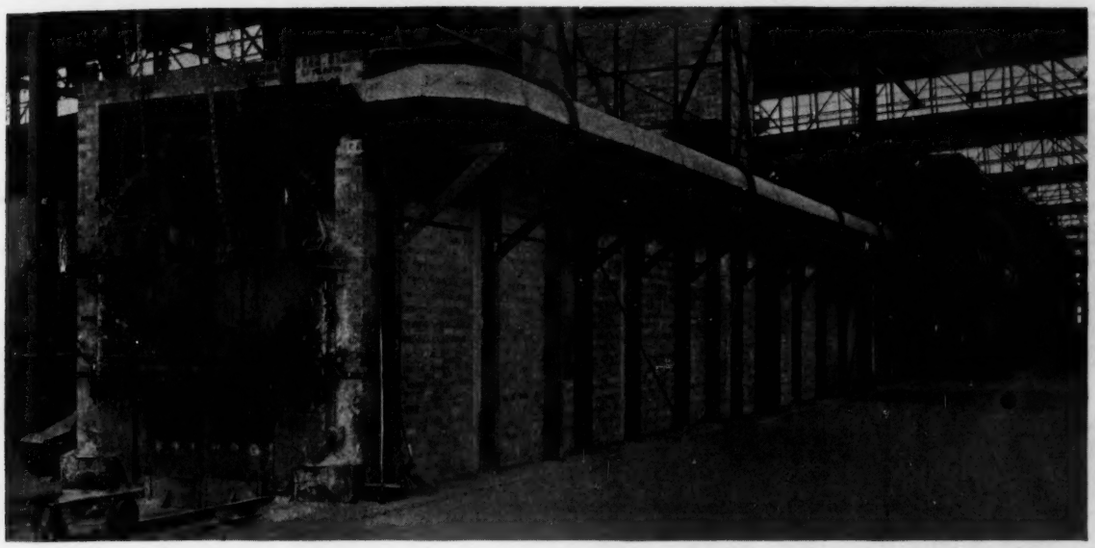
"A continuous type electric furnace for burning vitreous enamels on kitchenware was employed in 1929 for the first time," reports Mr. Weaver. "The coated stock is conveyed in and out of the firing chamber through the same end. Heat is supplied through nickel-chrome ribbons mounted on the sidewalls, the temperature being controlled automatically. The work in transit travels 12 feet a minute when burning a 3-coat job. The quality of this work also is said to be much improved.

According to Wallace G. Imhoff, president, the Wallace G. Imhoff Co., Pittsburgh, development in the pickling and hot galvanizing industries during the past year has been along practical lines. Progress has been made in methods of handling, use of inhibitors and in the electric heating of galvanizing furnaces.

Mr. Imhoff sees a growing tendency to test pickling solutions and to control the temperature of the bath by instruments. Increased pickling tank capacity and lower operating temperatures, he declares, now are accepted as the best practice. This permits the use of inhibitors and reduces fume difficulties.

M. I. Arms, president, the Aetna-Standard Engineering Co., Youngstown, O., considers that one of the noteworthy achievements of the year is a new pickling machine which gives positive control of the crate through a predetermined angle. The machine normally runs in balance and without any semblance of vibration. No springs or adjustments are necessary in securing the oscillation of the sheets. The gearing is entirely enclosed and runs in oil. All the oscillating mechanism is mounted on roller bearings.

A continuous-type electric furnace for burning vitreous enamels



Adoption of the tunnel kiln method of firing refractories has resulted in a product of higher grade

Higher Temperatures Create Need for Superior Refractories

KEEPING apace with the lengthier strides of all engineering achievement has been the refractories industry during 1929. Production of well over 50,000,000 tons of steel for the year has necessitated intensive study of refractories in the search for brick which is uniform in size and texture, thermally and mechanically strong, nonfluxible and with low heat conductivity. The dry press process of forming and tunnel kiln firing have become standard practices with many large refractory interests. Further research work and refinements have been high lights of progress.

G. A. Bole, research professor, engineering experiment station, Ohio State university, Columbus, O., is of the opinion that the dry press process coupled with tunnel kiln firing has allowed a better control and more economical production of a high grade refractory. Mr. Bole also mentions the introduction of various devices whose use results in a more uniform and accurate size product than formerly. Concerning progress made in refractory research, Mr. Bole mentions that researches into the dry press process at the engineering experiment station at Ohio State university and in the ceramic department at the University of Missouri have led to a better understanding of fundamentals.

R. E. Birch, research ceramic engineer of the experiment station, recently performed some experimental work to determine the effect of various forming pressures on the finished brick, using a hydraulic press. He discovered that commercial pressing is accomplished under pressures ranging from less than 550 to about 1500 pounds per square inch; that resistance to thermal spalling is reduced considerably by an increase in the forming pressure; and that additions of flint clay tend to diminish the degree of the change in body properties resulting from pressure increases.

Studies Slag Attack

The service committee on boiler refractories of the American Society of Mechanical Engineers has made considerable headway in the study of slag attack in boiler settings.

According to L. F. Reinartz, assistant general superintendent, American Rolling Mill Co., Middletown, O., the past year has seen decided trend toward improved combustion control of fuels in open-hearth furnaces. Operators are trying to obtain as high a flame temperature as possible to speed up the transfer of heat from the flame to the metal. In many instances it has been found necessary to install either suspended roofs or to use 18-inch ribbed construction. Thus the brick manufacturer is faced with the problem of producing a brick which will withstand these severe operating conditions. Attempts are being made to improve physical properties of basic brick so that they may be used in suspended roofs on open-hearth furnaces.

Mr. Reinartz points out the increased use of chrome brick in blocks, front walls and bulkheads. Chrome brick is replacing magnesite brick to a considerable extent in new bottoms. Sloping backwalls, especially in producer gas furnaces, practically have eliminated the backwall repair problem. Various special types of checker brick have been tried out during the past year but results to date are somewhat contradictory. Some furnace designers and builders are insulating regenerators with 4½ inches of standard varieties of insulating brick, and are using insulating cement on flues to the stack. Mr. Reinartz looks ahead and comments as follows:

"American magnesites apparently have demonstrated their ability to compete on even terms with foreign magnesites from an operating standpoint. Burnt refractories have been improved and it would not be surprising if some radical improvements would appear during 1930 in this particular field. The open-hearth furnace man's need during 1930 will be for the development of some type of brick which will meet the severe operating demands which are being imposed by the modern open-hearth furnace."

"No one development in refractories

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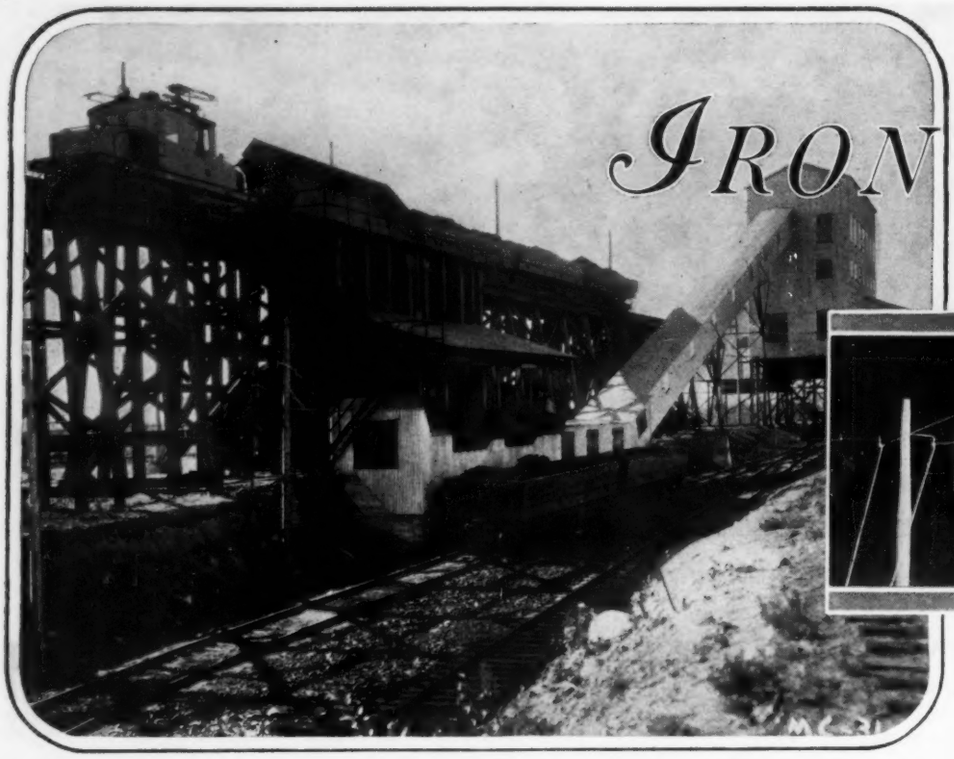
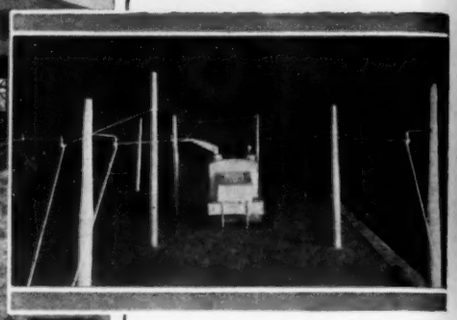


IRON ORE

Washing and screening plant at new Mesabi Chief mine



Model used for developing trolley layout in the pit

More Activity at Lake Superior Mines Than in Any Year Since War—Leading Companies Seeking To Increase Reserves—Effects of Mergers

By A. J. Hain

Associate Editor, Iron Trade Review

Summary: The Lake Superior iron ore industry has experienced one of the most active years in its history, in practically every department.

The tonnage moved is the largest of any peace-time year, and large stocks formerly overhanging the market have been greatly reduced, the remainder being mainly high phosphorus ore.

Recent mergers and pending mergers in the iron and steel industry and the gradual exhaustion of known independent merchantable reserves are causing consumers to seek assured sources of supply.

There was more exploration work in the past year than in any period since the great war-time development. And that, without disclosing any new deposits of first-rate importance.

More interest was shown by the independent iron ore, pig iron and steel companies in the acquisition of developed and undeveloped properties than for many years. Further negotiations are under way.

Several new mines were opened during the past year, and preparations made for opening others to take the place of mines recently exhausted or those nearing exhaustion.

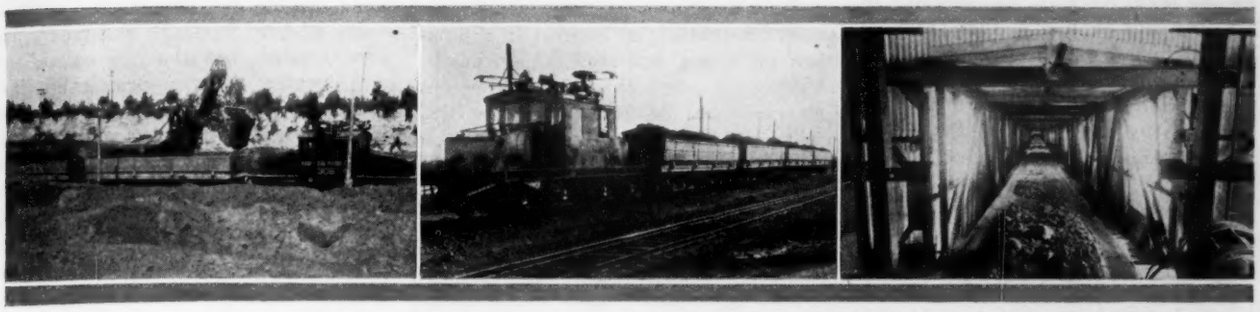
More plants and equipment for beneficiating ore were installed; experimental work proceeded apace.

WHILE shipments of iron ore from the Lake Superior district in 1929 were the largest of any peace-time year, and only slightly under the all-time record of 1917, the chief interest in the industry was not in shipments, but in the widespread changes in control of various properties. Another feature of outstanding importance was the exhaustion of a number of mines long known for their heavy shipments, the opening of new mines, and the resumption on a large scale of drilling and explorations.

Keen interest in future iron ore supplies on the part of producers and consumers is clearly indicated by the unusually large number of transfers of fees and leases, and purchases. Companies figuring in recent mergers and merger negotiations have been among the most active of those seeking to increase their reserves.

The largest acreages and tonnages embraced in any of the transactions in ore properties in the last few years are those which have been leased recently by the M. A. Hanna Co. from the Northern Pacific Railway Co. and individual owners on the Cuyuna range, and from the Great Northern Iron Ore Properties on the Mesabi range. The Cuyuna range properties include one developed mine, namely, the Feigh mine, which was opened in 1919 and shipped for sev-

INDUSTRY SPEEDS UP



Sixty-ton electric locomotive hauling 30-cubic yard ore cars in the new Mesabi Chief mine, and a view in washing plant, showing belt conveying ore from screening unit to washing plant

eral years before closing, and also all of the undeveloped land of the Northern Pacific railway in the Cuyuna "South" range. This is a large acreage that in the years to come probably will produce substantial tonnages of ore.

The Mesabi range properties include most of the remaining unleased lands controlled by the Great Northern Iron Ore Properties which have considerable known deposits.

National Steel Interested

The Hanna company also obtained leases on the Bray-Gordon properties, Mesabi range, formerly held under lease by Republic Iron & Steel Co. On the Cuyuna range the company took leases on the Portsmouth and Meacham mines; also the Huntington and Martin mines which formerly were operated by the Whitmarsh Mining Co.

The company has taken a lease on the Cardiff mine in Michigan, formerly held by the Buffalo Iron Mining Co., as well as all of the Florence Iron Co.'s undeveloped lands in Michigan and Wisconsin. The Florence lands, although unexplored, are well located with respect to the known iron formation, comprising an area of 4320 acres. This group also includes the old Florence mine which will be exhausted shortly, except for a large tonnage of ore which is not desirable at the present time.

It is understood the Hanna company is acting for the National Steel Corp. in these transactions.

The Weirton Steel Co., before merging with Hanna and Great Lakes, owned a substantial interest in the Hanna Ore Mining Co. With the merger formed by these companies, the National Steel Corp. acquired a much larger interest in the mining company. Other sources of supply for Weirton are an interest in the Canisteo-Cliffs Mining Co., and Holman-Cliffs Mining Co., as well as a long-term lease with another producer.

Other recent changes in control of mines reflect the desire of mining companies and associated iron and steel interests to acquire larger reserves.

Ore Shipments Increased 20.5 Per Cent

Totals by Ranges, Gross Tons

	1928	1929
Mesabi	34,992,592	42,437,969
Vermillion	1,571,360	1,787,945
Cuyuna	2,037,306	2,561,665
Total Minnesota	38,601,258	46,787,579
Gogebic	6,481,158	7,620,060
Marquette	4,060,209	5,153,033
Menominee	4,838,249	5,643,928
Total lake shipments	53,980,874	65,204,600
Total shipped all-rail	872,511	946,000
Grand total	54,853,385	66,150,600

1929 increase 20.59 per cent, 11,297,215 tons.

By Ports and Railroads, Gross Tons

	1928	1929
ESCANABA:		
C. & N. W.	3,884,690	4,445,775
C. M. & St. P.	1,602,866	1,902,798
MARQUETTE:		
D. S. S. & A.	758,736	875,843
L. S. & I.	2,652,166	3,572,545
ASHLAND:		
C. & N. W.	4,574,275	5,358,139
Soo Line	1,906,883	2,261,921
SUPERIOR:		
Great Northern	13,469,476	17,355,736
Soo Line	1,135,600	1,373,871
Northern Pacific	808,618	893,532
DULUTH:		
D. M. & N.	17,454,063	20,562,705
TWO HARBORS:		
D. & I. R.	5,733,501	6,601,735
Total	53,980,874	65,204,600

Republic's New Resources

The Pettit mine, underground, Mesabi range, was opened originally by the Republic Iron & Steel Co., and the lease was given up three years ago, since which time the mine has been idle.

The Philbin, underground, Mesabi range, was originally opened by the Oliver company, which surrendered the lease several years ago. Republic company has now taken the lease.

Republic's iron ore reserves were listed in 1927 as 110,215,661 tons, 75,478,029 tons in southern states, and 34,737,632 tons in the Lake Superior district, since which time it has acquired additional reserves in the latter territory, as the foregoing indicates. When the merger of the Republic, Central Alloy Steel Corp., Donner Steel Co., and Bourne-Fuller Co. was announced Dec. 19, 1929, the new company stated its combined iron ore resources amount to 125,000,000 tons. Donner brings to this company the Alexandria mine, in Minnesota, rated by the state as having 2,488,288 merchantable tons in reserve. Central Alloy has an interest in several mines, operated by other companies. The

net result of the merger so far as iron ore is concerned is to measurably increase its resources, through association with two of the large independent ore producing companies.

The Canisteo mine, an open pit mine, Mesabi range, was dropped by the Oliver Iron Mining Co. in 1925, since which time it has been idle. The Canisteo-Cliffs Mining Co., subsidiary of the Cleveland-Cliffs Iron Co., took up the lease recently, will dewater the pit, and will explore it further.

The Holman mine, open pit, Mesabi range, was surrendered by the Oliver company in 1925. The lease has been taken up by the Holman-Cliffs Mining Co., subsidiary of the Cleveland-Cliffs company. The pit has been enlarged, and a new washing plant is nearing completion.

The Dean mine, open pit, Mesabi range, was operated formerly by the Hanna company and the last shipment was made in 1927. Now the Cleveland-Cliffs company has acquired control of it, and is making tests to determine the character of plant necessary to beneficiate and utilize the ore.

Acquire Mesabi Range Mines

The St. James, underground, Mesabi range, was opened by the Corrigan, McKinney Steel Co., and operated by it up to six years ago, since which time it has been idle. The fee has been purchased from the Longyear, Mesaba Land & Iron Co. by Oglebay, Norton & Co.

The Mohawk, underground, Mesabi range, was originally opened by Pickands, Mather & Co. and lease was given up six or seven years ago. The fee also has been purchased by Oglebay, Norton. The latter have taken over the operation of the new Greenway mine, Mesabi range, from T. S. Nelson and associates.

The Miller, underground, Mesabi range, was opened by the Wheeling Steel Corp., which surrendered the lease several years ago. Oglebay, Norton recently purchased the fee to this property. These four are the first mines taken by Oglebay, Norton on the Mesabi range since they abandoned the Woodbridge in 1922.

The Pennington, an open pit, Cuyuna range, was operated by Tod-Stambaugh Co. until it surrendered the lease in 1923. The lease has been taken up by Clement K. Quinn & Co. who will mine the ore mainly by the underground method.

The Iroquois, Mesabi range, formerly operated by Quinn & Co., and idle for a number of years, has been acquired by the Inland Steel Co.

The Tilden, underground, Gogebic range, which was formerly operated by the Oliver company, now is controlled by the Corrigan, McKinney Steel Co.

A substantial interest in five mines operated by the Shenango Furnace Co. has been obtained by the Crucible Steel Co., while the Shenango company has acquired a 3 per cent interest in the Mahoning mine, at Hibbing, one of the largest mines in the Lake Superior district, owned by the Great Northern Iron Ore Properties and operated by Pickands, Mather & Co.

The By-Products Coke Corp. acquires a substantial interest in a number of mines operated by Pickands, Mather & Co. through its recent merger with the Zenith Furnace Co., Toledo Furnace Co., and Perry Iron Co.

Extensive exploration work was resumed on the Menominee range, in Michigan. The Hanna company was active in drilling in several localities. A 5-year option was obtained by the Jones & Laughlin Ore Co. on seventeen 40-acre tracts just east of Crystal Falls, and drilling was in progress most of the year. The Brule Mining Co., operated by Oglebay, Norton & Co., sank a shaft at its new Brule mine in the Iron River district to a depth of 500 feet, and is exploring on the 350-foot and 500-foot levels. The same company explored the Lennox property in the city of Stambaugh.

Pickands, Mather did some drilling at the Penn mine property to determine the desirability of sinking a shaft. It deepened its shaft at the East Vulcan mine and is cross cutting through the ore body. The Oliver company also drilled at the Chapin mine. Most of this work is of an investigational character and is likely to continue in 1930.

Inland Steel Co. has under lease four 40-acre tracts in the Greenwood district, west of Ishpeming, the south rim of the Marquette range, and has been carrying on a campaign of diamond drilling for 18 months. Certain seams of hard hematite and magnetite were located, but the ore existed at such depths it was practically impossible to control the course of the drills until the formation was reached. The deviations were so great that the ore body could not be outlined. A shaft 12 x 12 feet will be sunk 1050 feet, from which a cross cut will be driven to the ore formation, for underground exploration.

Ford Mine Begins Shipping

The last ore body discovered on the Marquette range was several years ago on property now known as the Blueberry mine of the Ford Motor Co., from which the first shipments were made in 1929.

Though taxation methods discourage exploration in Minnesota, the Great Northern Iron Ore Properties conducted an important drilling campaign in the past year in Aitkin and Crow Wing counties in an effort to locate an extension of the Cuyuna range toward the north, in the direction of

Minnesota Ore Reserves and Assessed Values

Ore in Ground

County	May 1, 1928 Tons	May 1, 1928 Assessed value	May 1, 1929 Tons	May 1, 1929 Assessed value
St. Louis	1,048,805,191	$221,958,543	1,026,793,702	$216,440,490
Itasca	146,609,471	17,750,599	156,060,871	18,761,948
Crow Wing	52,723,628	2,978,045	47,793,077	2,562,303
Totals	1,248,138,290	$242,687,187	1,230,647,650	$237,764,741
Ore in Stockpiles				
St. Louis	9,208,050	$6,608,522	10,745,558	$6,184,048
Itasca	341,474	379,363	195,174	228,290
Crow Wing	544,810	516,751	471,502	441,110
Totals	10,094,334	$7,504,636	11,412,234	$6,853,448
Total Merchantable Ore in Ground and Stockpiles				
St. Louis	1,058,013,241	$228,567,065	1,037,539,260	$222,624,538
Itasca	146,950,945	18,129,962	156,256,045	18,990,238
Crow Wing	53,268,438	3,494,796	48,264,579	3,003,413
Totals	1,258,232,624	$250,191,823	1,242,059,884	$244,618,189

The assessments as given in this table do not include those for surface values, structures or improvements.

Michigan Ore Reserves and Assessed Values

County	1928 Tons	1928 Total value	1929 Tons	1929 Total value
Dickinson	5,250,962	$3,720,000	4,886,465	$3,520,000
Gogebic	48,681,075	38,184,000	48,587,126	37,171,000
Iron	59,501,715	21,688,000	58,035,954	22,835,000
Marquette	60,219,781	30,005,000	57,920,862	28,232,000
Totals	173,653,533	$93,597,000	169,430,407	$89,758,000

the Mesabi range. Nothing of importance was reported, though a study of geological conditions will continue to be made.

For several years the proportion of iron ore from the Lake Superior district that has been crushed, washed or beneficiated in some manner has held steadily at about 35 per cent. This percentage is likely to show an increase in the near future as more plants were built during 1929.

The Oliver company has built a screening plant at its Sibley mine, Vermillion range, and is enlarging its crushing plant at Coleraine, Mesabi range.

The International Harvester Co. is building a sintering plant at its Bruce mine, Mesabi range. A washing plant was built at Nashwauk, Minn., by Butler Bros., and this same interest is building a washing and screening plant at Cooley, Minn., and concentrator at Buhl, Minn., all on the western end of the Mesabi. A crushing plant was built by the Evergreen Mining Co., Cuyuna range. More extensive use of jigs is noted in beneficiating ore.

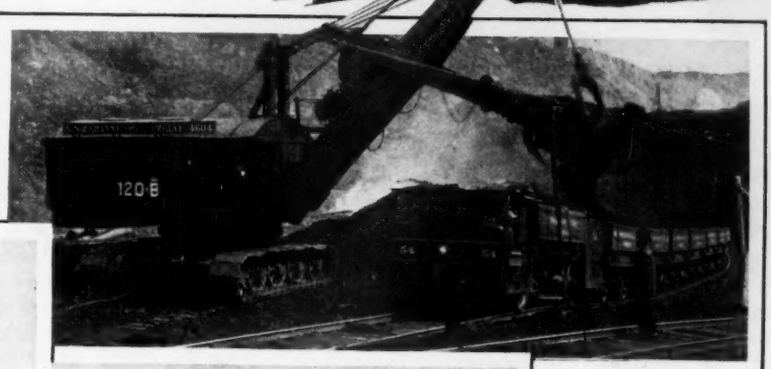
Mesabi Chief in Production

A screening and washing plant was erected at the Mesabi Chief mine, and this large producer was brought to the shipping stage in 1929, one of the most interesting developments of the year.

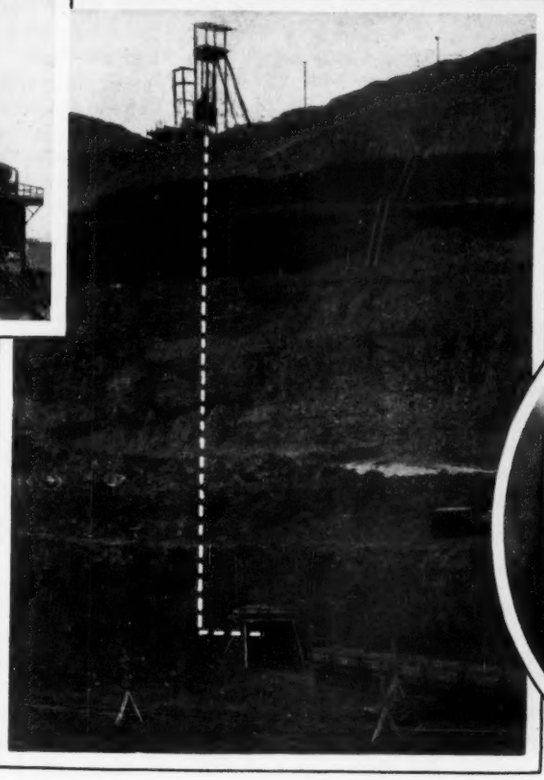
The Mesabi Chief is operated by the Hanna company and comprises one of the group of the Hanna Ore Mining Co., the stockholders of which are National Steel Corp., Wheeling Steel Corp., American Rolling Mill Co., and Wickwire-Spencer Steel Corp. The property occupies three 40-acre tracts. The fee is owned by the state of Minnesota, and is part of the Great Northern Iron Ore leases. This deposit has been untouched, though well known since the early days of the Mesabi range. The mine is worked by the open pit method with part of the tonnage high enough in grade to be shipped direct and the remainder treated in a washing plant, which is

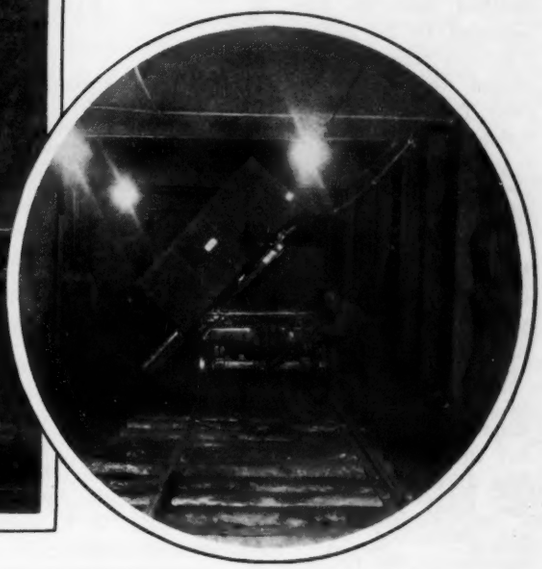
(*Concluded on Page* 69)

Combination electric locomotive and ore car as developed at Susquehanna mine

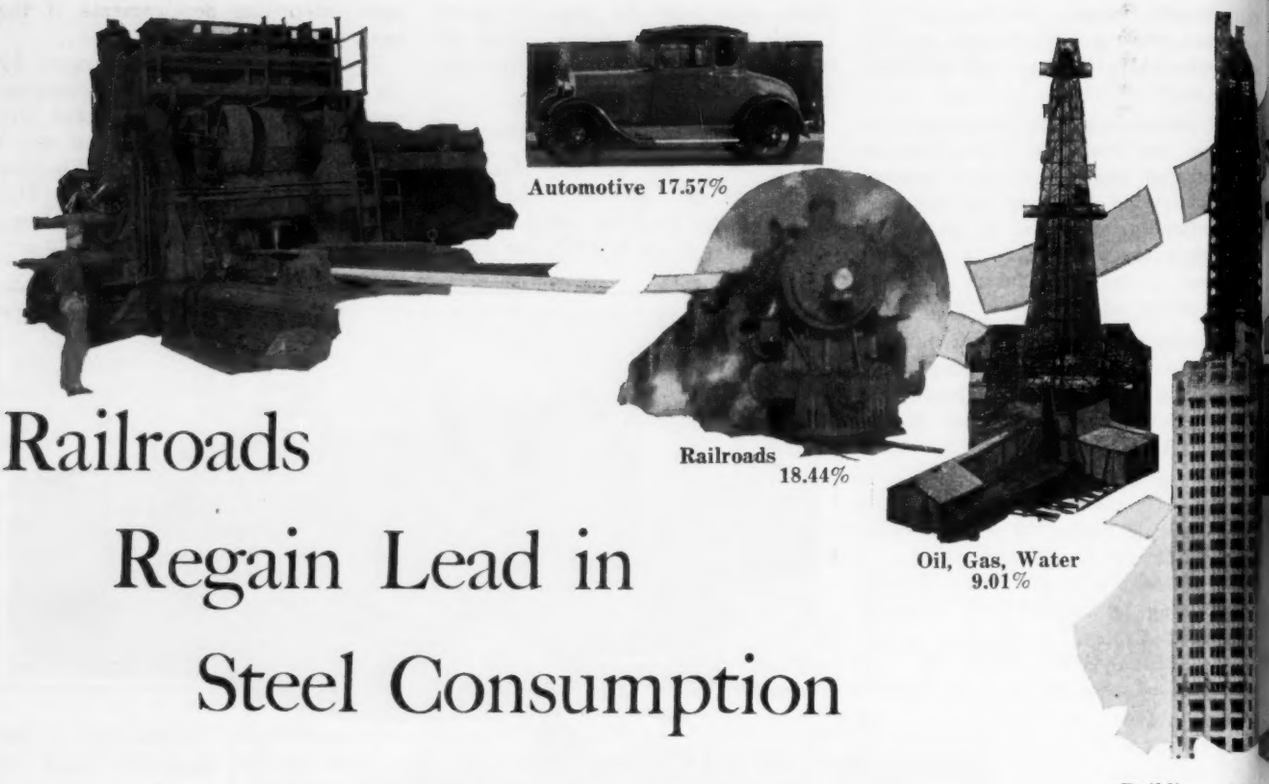


Headframe for hoisting ore through shaft from the pit





View in Susquehanna mine, train emerging from tunnel. Note headframe above tunnel. (Right) Dumping car at the shaft station



Railroads Regain Lead in Steel Consumption

THE greatest year in the history of the steel industry finds a total estimated distribution of finished steel from American producers of 39,103,200 gross tons. This represents an increase in finished rolled steel consumption of 9.70 per cent over 1928, the previous record year.

Co-operation from over 100 producers, far exceeding that of previous years, has enabled IRON TRADE REVIEW to present its eighth annual analysis of finished rolled iron and steel consumption in greater refinement. An actual total of 36,157,095 tons of finished rolled steel and 4,282,367 tons of semi-finished material was reported. Of the latter, 2,517,875 tons was included in reports to IRON TRADE REVIEW as finished steel products by companies operating only finishing mills. The difference, or 1,764,492 tons, added to the 36,157,095 tons of finished steel reported, brings the tonnage actually distributed to 37,921,587 tons, or very near the estimated total output for the United States. The difference between the total report and the estimated output represents the production of companies not reporting and minor discrepancies such as the lack of uniform classification by individual manufacturers.

In the table on this page is shown the breakdown of the ingot output of steel producers in 1929. Actual figures for 11 months and an estimated total for December were used. Allowing for conversion losses and ingots going directly into forgings, a total of 39,103,200 tons of finished rolled steel is estimated for 1929.

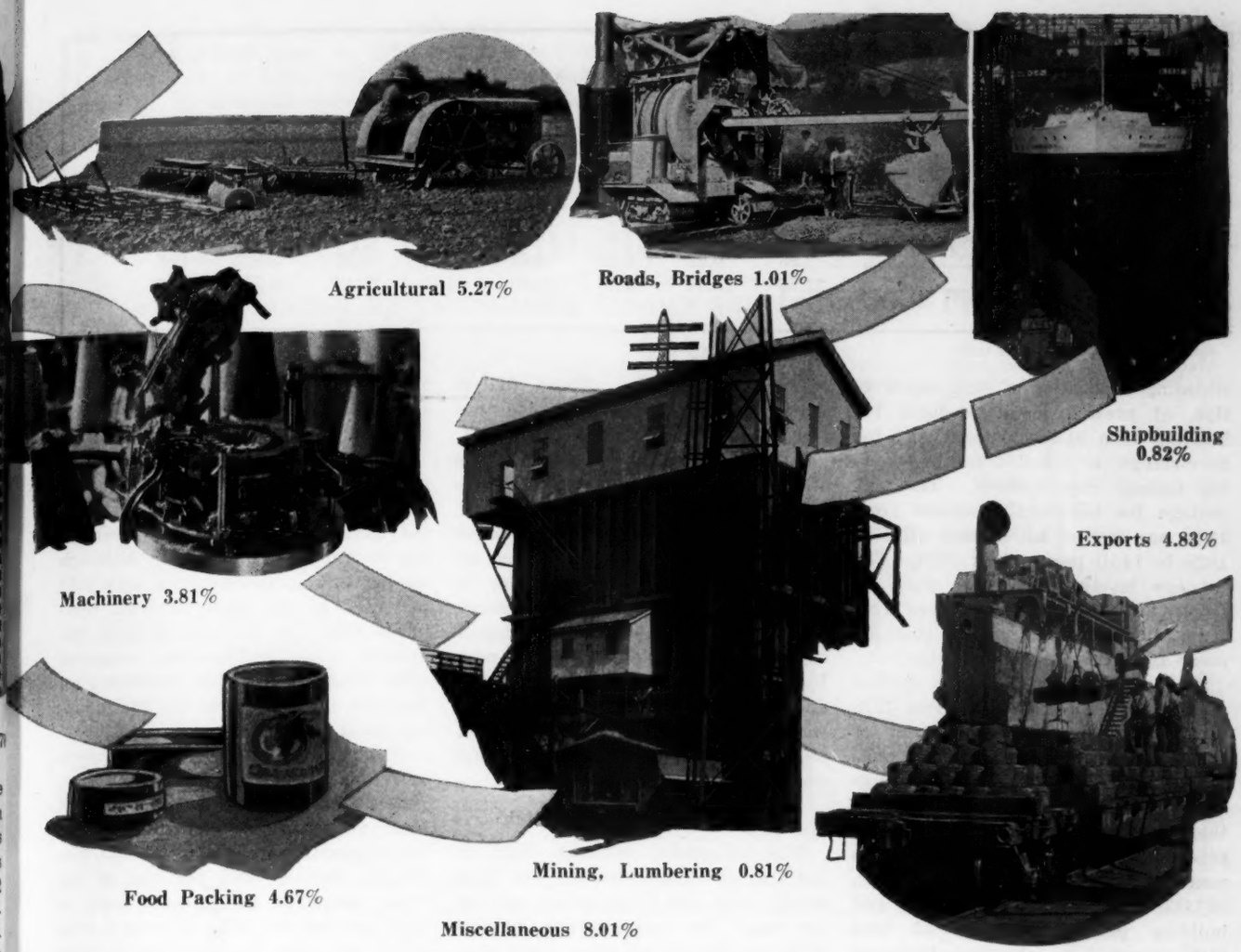
This then is allocated to the various leading consuming industries on the basis of the percentages obtained from the actual reports received. It shows railroad consumption as 7,210,630 tons in 1929 and automotive as 6,870,432 tons. All classes show appreciable increases over 1928 except exports. Although exports in the past year should show a slight increase over those of 1928 when final figures are compiled, the difference in the IRON TRADE REVIEW data may be attributed to incomplete reports from producers.

Although the railroad industry has regained its position of leadership as the greatest single consuming force in the American steel industry, according to the figures presented, automotive needs expanded considerably in 1929. Of the approximately 1,300,000 tons gain in railroad demand, about 180,000 tons was rails and 432,000 tons was plates. Increases of size also were recorded in demands of railroads for shapes, bars and sheets. Tonnage requirements of the railroads are much more easily traceable than those entering the automotive industry. A considerable quantity of steel products final-

How Steel Ingots Shrink

		Gross Tonnage
Steel ingot production, 1929, (11 months actual, December estimated)		54,685,000
Ingots to forgings direct	375,000	
Loss in conversion of ingots to semi-finished steel, 20 per cent	10,862,000	11,237,000
Semifinished steel production		43,448,000
Loss in conversion, semifinished to finished steel, 10 per cent		4,344,800
Total finished rolled iron and steel		39,103,200

Distribution—Industry	% of total	Tonnage	
Railroads	18.44	7,210,630	
Automotive	17.57	6,870,432	
Buildings	14.70	5,748,170	
Oil, gas and water	9.01	3,523,198	
Exports	4.83	1,888,685	
All other	35.45	13,862,085	
Totals	100.00	39,103,200	39,103,200



ly consumed by the automotive industry might be reported by producers as going to the electrical industry, to the miscellaneous class of manufacturers or through jobbers. It is especially true that a quantity of steel is listed under the jobber classification, ultimately consumed by accessory manufacturers for the automotive industry.

A comparison of the requirements of the two groups over the period of years since IRON TRADE REVIEW inaugurated these annual surveys of steel consumption is shown in the following table:

	Automotive	Railroad
1922	2,214,164	6,152,290
1923	3,303,106	9,675,388
1924	3,009,673	7,289,920
1925	4,629,259	7,064,376
1926	5,101,431	7,711,309
1927	4,192,722	6,402,230
1928	6,330,588	6,066,813
1929	6,352,756	6,681,562

It will be seen that although automotive demands in 1929 fell below that of the railroads, it was the highest in history, surpassing by a small margin the requirements of the preceding year. Increased activity of the carriers in ordering rolling stock was largely responsible for the gain in railroad consumption. This is especially noticeable in the increased demand for plates. Car and locomotive consumption of this product in 1929 was 1,058,875 tons compared with 616,204 tons in 1928.

Rail programs also were more extensive in 1929 than in the year preceding. A total of 2,368,431 tons of heavy rails was delivered to carriers in 1929 compared with 2,184,528 tons in 1928. A gain of about 110,000 tons also was recorded in angle bars, steel ties and other track accessories, in a gain of from 848,818 to 959,003 tons. In fact, the only one of the three divisions of railroad activity registering a decrease was the construction of railroad buildings and bridges. These total needs in 1929 were only 639,455 tons compared with 682,105 tons in 1928.

Automotive Influence Felt

The influence of the automotive industry as usual was felt most directly by the producers of bars, sheets, strip, and wire. Comparison of 1928 and 1929 automotive consumption figures reveals a decrease of about 50,000 tons in sheets but a gain of almost 200,000 tons in strip. The largest automotive increase was in bars, 1929 demand exceeding that of 1928 by almost a half million tons. Plate consumption increased from 194,852 tons in 1928 to 256,394 tons in 1929. This gain more than offsets the shrinkage in sheet consumption and may again point a trend toward automotive requirements.

Requirements of the automotive industry for tubing and pipe totaled 86,320 tons in 1929, compared with 73,689 tons in 1928. This about offsets the drop in wire consumption, which fell from 191,753 tons in 1928 to 178,845 tons in the past year.

Despite the fact that the increase in galvanized sheets is small in comparison with total output, the gain is sufficiently large to be of interest to sheet producers. The automotive manufacturers required 28,176 tons of this product in 1929 and only 7658 tons in 1928. This is the largest proportionate increase of any product entering the automotive field, representing almost a quadrupling of demand.

Despite a year of decreased building activity, steel consumption for that industry increased. The steadily

Consumption Ratios of Main Groups

	1922	1923	1924	1925	1926	1927	1928	1929
Railroads	24.96	31.02	27.54	22.26	22.81	20.37	17.02	18.44
Automotive	14.84	10.59	11.37	14.60	15.09	13.34	17.76	17.57
Buildings	11.83	13.53	14.44	15.26	13.10	14.89	15.22	14.70
Oil, gas and water	8.93	10.60	8.43	8.03	9.29	8.90	7.72	9.01
Export	7.83	6.22	5.89	4.47	5.29	5.39	5.52	4.83
All other	31.56	28.04	32.33	35.36	34.42	37.11	36.76	35.45

widening application of steel construction, of pressed metal products for building trim and equipment and for furnishings, is reflected in the growing tonnage requirements. The percentage for buildings decreased from 15.22 per cent of all finished steel in 1928 to 14.70 per cent in 1929. The tonnage involved, however, went up from 4,831,090 to 5,317,114 tons. This is by far the greatest year in steel demand from the building industry.

The only product showing a marked difference in the last year from 1928 was structural shapes. A total of 2,025,987 tons was reported for erection materials and framework in 1929 as compared with 1,811,169 tons in the preceding year. All other sheets, except galvanized, were in heavier demand by the building industry in 1929, 263,060 tons going into trim and building parts, while 499,352 tons was consumed by the manufacturers of stoves, refrigerators, kitchen equipment, furnaces, etc. These figures show the large gain over 94,444 tons and 424,355 tons in 1928.

Industries dominating consumption of finished steel products in 1928 continued that hold in 1929. The railroad industry, for track construction and repair, took 93.34 per cent of all heavy rails and 91.87 per cent of angle bars, ties and other track accessories. Mining and lumbering dominated light rails, taking 72.99 per cent. Railroads with 25.47 per cent for cars and locomotives, and oil, gas and water, with 18.92 per cent for tanks, reservoirs, etc., dominated the plate consumption.

Automotive Purchases High

The automotive industry kept its position as chief consumer for bars, sheets, strip and hoops, bands and cotton ties. Its requirements included 36.54 per cent of all other black plate and sheets, 60.46 per cent of strip steel, 37.49 per cent of bars and shapes, excepting concrete bars, and 47.53 per cent of hoops and bands.

Changes in some of the other consuming industries were not marked by any variation in their percentage to the total although materially increasing in tonnage. For instance, although mining and lumbering took only 0.81 per cent of the total in 1929, compared with 0.80 per cent in 1928, the amount was 295,188 tons compared with 254,275 tons. This represents an increase of 16 per cent for the industry itself.

Shipbuilding, experiencing a more active year than usual since the war, reflected this activity in its increased steel requirements. Consumption of the shipbuilding industry in 1929 was 296,554 tons, or 0.82 per cent of the total, compared with 168,436 tons, or 0.53 per cent in 1928. This is a gain of 77 per cent in steel requirements for the shipbuilding industry in 1929.

Percentage of Products to Consuming Groups

	Heavy rails	Light rails	Angle bars, steel ties, track accessories	Plates	Structural shapes	Bars and shapes under 3-inch except concrete	Concrete bars	Hoops, bands, cotton ties	Black plates for tinning	All other sheets, excepting galvanized	Galvanized sheets	Tubing and pipe	Wire products	Strip steel
1—Railroads														
a Cars and locomotives	....	....	....	25.47	10.59	5.72	....	2.96	....	4.18	6.77	1.68	0.45	0.62
b Track construction	93.34	3.33	91.87	0.45	0.01	1.75	0.94	0.02	....	0.03	0.27	0.02	1.68	....
c Buildings and bridges	0.08	0.05	0.05	2.89	8.00	1.50	7.00	0.43	....	0.45	0.84	0.03	0.87	....
2—Buildings														
a Erection materials — framework—trim—etc.	0.07	0.98	0.15	13.56	51.99	5.74	54.14	2.74	0.02	5.98	13.15	2.57	7.37	4.09
b Furnishings—metal furniture —stoves—refrigerators—etc.	....	....	0.96	0.29	0.64	1.68	0.43	2.40	0.16	9.81	3.57	0.92	5.56	4.50
c Other pressed metal products for buildings	....	....	....	0.02	....	0.04	....	2.73	0.59	1.53	2.53	....	0.10	2.81
3—Highways, highway bridges	....	....	0.16	0.54	1.54	0.26	19.72	0.65	....	0.48	5.92	0.01	0.55	0.10
4—Automotive	0.03	0.06	0.01	6.17	0.48	37.49	....	47.53	0.92	36.54	2.05	2.22	8.28	60.46
5—Oil, gas and water	0.13	3.84	0.15	18.92	3.31	1.92	0.22	1.43	1.42	3.49	2.01	49.35	1.36	0.36
6—Mining and lumbering	0.77	72.99	2.31	0.48	0.51	0.50	....	1.19	0.02	0.33	0.82	0.27	0.77	0.23
7—Agricultural	0.03	0.23	0.11	1.04	0.36	14.26	1.01	10.39	....	3.07	7.31	0.55	21.82	2.78
8—Shipbuilding	....	....	....	4.49	1.35	0.42	....	0.05	....	0.17	0.41	0.18	0.28	0.05
9—Machinery, tools, equipment	0.06	0.70	0.02	4.14	2.34	7.07	....	2.83	0.27	6.90	0.24	2.76	1.23	6.71
10—Food and packing industry	....	....	....	1.26	....	0.04	....	5.27	74.51	4.28	1.05	....	1.50	0.40
11—Exports	4.72	8.42	1.72	5.13	7.14	2.62	0.83	3.21	14.53	3.95	9.13	4.56	5.83	0.60
12—Miscellaneous	0.59	3.92	.81	9.25	2.60	10.97	0.67	9.15	4.55	11.50	13.87	3.00	17.09	13.75
Jobbers	0.18	5.48	1.68	5.90	9.14	8.02	15.02	7.02	3.01	7.31	30.06	31.88	25.26	2.54
Grand totals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Oil gas and water, showing a gain of from 2,452,199 tons in 1928 to 3,259,229 tons in 1929, reflected its increased requirements almost entirely in four products. With a total gain of 807,030 tons, 459,370 tons was pipe and 241,554 tons plates. This resulted from the unusually heavy line pipe operations in the Southwest and the increased demands for storage facilities due to overproduction. Other large increases in this industry included 41,428 tons of shapes, 34,247 tons of bars and 42,762 tons of sheets.

Little change occurred in the machinery industry, which took 3.48 per cent of all steel in 1928 and 3.81 per cent in 1929. The food packing industry also remained in line as did exports and miscellaneous uses.

Approximately a half million tons more steel was handled by jobbers in 1929 than in 1928, the percentage to the total being 11.05 and 10.78.

All semifinished steel products shipped to manufacturers for further conversion increased over 1928 with the exception of wire rods. Billet and slab shipments during the past year were the greatest ever recorded in these analyses, exceeding one and a half million tons. Following is a comparison of shipments of semifinished steel for further conversion in 1928 and 1929:

	Gross Tons	
	1929	1928
Billets and slabs	1,503,803	1,337,468
Sheet and tin bars	1,325,417	1,183,330
Wire rods	601,164	760,545
Skelp	851,983	583,160

Distribution of Finished Steel in Gross Tons

Shown by Consuming Group and Individual Product

	Heavy rails	Light rails	Angle bars, steel ties and other track accessories	Plates	Structural shapes	Bars and shapes under 3-inch, excepting concrete bars	Concrete bars	Hoops, bands, and cotton ties
1—Railroads								
a Cars and locomotives	102	4	47	1,058,875	412,774	378,988	.....	28,222
b Track construction and repair	2,368,431	4,039	959,003	18,518	507	115,828	6,551	155
c Buildings and bridges	2,056	65	550	120,033	311,717	99,426	48,720	4,086
2—Buildings	.....	.....	.....	.....	.....	.....	.....	.....
a Erection materials—framework—trim—etc.	1,850	1,191	1,573	563,815	2,025,987	380,089	376,580	26,154
b Furnishings—metal furniture—stoves—refrigerators—etc.	.....	.....	10,000	12,149	24,770	111,066	3,017	22,880
c Other pressed metal products for buildings	.....	.....	.....	1,034	.....	2,500	.....	26,031
3—Highways and highway bridges	.....	.....	1,700	22,297	59,895	17,197	137,159	6,154
4—Automotive	656	68	79	256,394	18,691	2,482,982	.....	453,237
5—Oil, gas and water	3,183	4,663	1,595	786,444	128,879	127,226	1,557	13,637
6—Mining and lumbering	19,426	88,526	24,122	19,803	19,848	33,424	7	11,325
7—Agricultural	725	275	1,197	43,232	13,999	944,396	7,000	99,120
8—Shipbuilding	.....	.....	.....	186,617	52,573	27,692	.....	476
9—Machinery, tools and equipment (including electrical)	1,488	849	256	172,109	91,346	467,949	.....	26,979
10—Food and packing industry	.....	.....	.....	52,195	186	2,644	.....	50,234
11—Exports	119,714	10,215	17,905	213,132	278,263	173,223	5,799	30,633
12—Miscellaneous	15,357	4,745	8,091	385,194	101,220	726,870	4,659	87,300
Totals	2,532,988	114,640	1,026,118	3,911,841	3,540,655	6,091,500	591,049	886,623
Jobbers	4,516	6,652	17,754	245,292	356,367	531,290	104,469	66,989
Grand totals	2,537,504	121,292	1,043,872	4,157,133	3,897,022	6,622,790	695,518	953,612

	Black plates for tinning	All other black plate and sheets, excepting galvanized sheets	Galvanized sheets	Tubing and pipe	Wire products	Strip steel	All other finished steel products	Grand Totals, all finished products	Per Cent of Total
1—Railroads									
a Cars and locomotives	3	184,222	93,019	65,608	9,761	12,106	251,592	2,495,323	6.90
b Track construction and repair	.....	1,200	3,746	782	36,184	.....	31,840	3,546,784	9.80
c Buildings and bridges	.....	19,882	11,508	1,027	18,897	.....	1,488	639,455	1.74
2—Buildings	.....	.....	.....	.....	.....	.....	.....	.....	.....
a Erection materials—framework—trim—etc.	360	263,060	180,600	100,063	159,285	79,875	22,742	4,183,224	11.57
b Furnishings—metal furniture—stoves—refrigerators—etc.	2,807	432,026	49,008	35,780	120,067	87,871	16,272	927,713	2.56
c Other pressed metal products for buildings	10,205	67,326	34,787	.....	2,261	54,840	7,193	206,177	0.57
3—Highways and highway bridges	.....	21,250	81,250	201	11,867	2,000	3,880	364,850	1.01
4—Automotive	15,819	1,608,807	28,176	86,320	178,845	1,180,663	42,019	6,352,756	17.57
5—Oil, gas and water	24,038	153,652	27,612	1,921,559	29,479	7,000	28,705	3,259,229	9.01
6—Mining and lumbering	341	14,723	11,251	10,458	16,635	4,432	20,867	295,188	0.81
7—Agricultural	.....	135,100	100,313	21,462	471,436	54,209	10,691	1,903,155	5.27
8—Shipbuilding	.....	7,677	5,630	7,003	6,005	1,000	1,881	296,554	0.82
9—Machinery, tools and equipment (including electrical)	4,622	303,600	3,325	107,417	26,661	131,119	37,851	1,375,571	3.81
10—Food and packing industry	1,278,434	188,419	14,421	704	32,494	7,722	56,108	1,683,561	4.67
11—Exports	249,322	173,926	125,351	177,589	125,959	11,798	32,142	1,744,971	4.83
12—Miscellaneous	78,329	505,884	190,274	116,587	368,628	268,544	30,780	2,892,462	8.01
Totals	1,664,280	4,080,754	960,271	2,652,560	1,614,464	1,903,179	596,051	32,166,973	....
Jobbers	51,605	321,771	412,810	1,241,358	545,762	49,603	33,884	3,990,122	11.05
Grand totals	1,715,885	4,402,525	1,373,081	3,893,918	2,160,226	1,952,782	629,935	36,157,095	100.0

Business Sure of Hoover, but Congress Is an Enigma

House Constructive, but Senate Recalcitrant—Departments To Be Helpful—Will Clarify Shipping Policy—Railroad Unity Is Nearer

By Lynne M. Lamm

Washington Correspondent, Iron Trade Review

PRESIDENT HOOVER in his governmental capacity has been favorable to business and industrial interests and always has shown his good will toward them. It is, therefore, not too much to assume that this attitude will continue and that during 1930 business and industry can look forward to helpfulness from the administration.

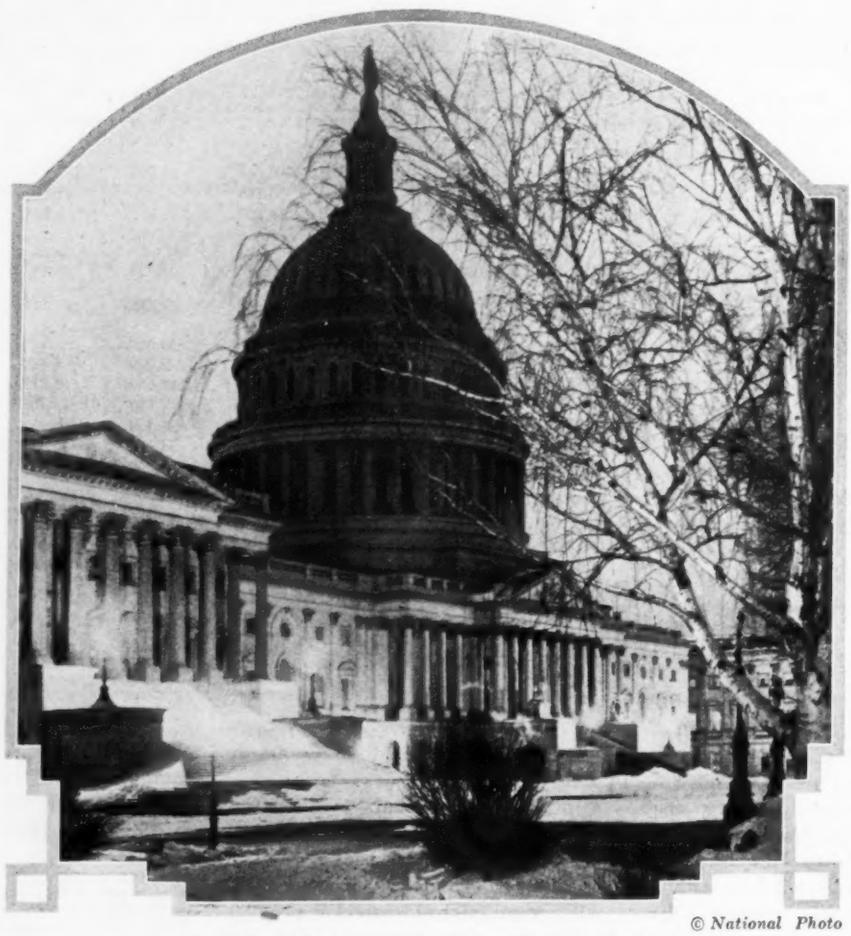
On the other hand, there are in Washington activities over which the President has no control—principally those of congress. It is difficult to tell what congress will do and while the present house is apparently willing to co-operate with the President, the same cannot be said of the senate. In addition to the congressional situation, it must also be taken into consideration that many minor difficulties arise between the various government departments and business interests about which it is impossible for the President to hear and deal with because of the multiplicity of his duties. Congress is now in the long session which could, if it desired, be continued until December. The matter of greatest interest at the moment is the tariff. It is being freely predicted that it will be the middle of January or early February before the upper house finally disposes of the bill. After the senate has passed it, the bill goes to conference, where it is likely either to stay permanently and be "killed" or be reported out anywhere from a minimum of one month to a maximum of several months.

Some leaders in both houses of congress are of the opinion the bill will not reach the President for signature and this is based on the fact there are so many controversial matters that the conferees will never be able to reach an agreement.

President Hoover in his annual message to congress has asked for action on a good many matters including public building, railroads, merchant marine, electrical power regulation, immigration, and other similarly pertinent subjects.

As to immigration, it is well known that the President has been opposed to the quota system and he is asking congress if "perhaps some system of priorities within the quotas could produce better results and at the same time enable some hardships in the present system to be cleared up." He recommended "that the congress should give the subject further study and the executive departments will gladly co-operate with the hope of discovering such method as will more fully secure our national necessities."

The question of tax reduction which it was supposed would have to be taken care of in 1930 has already been met, at least for the year. Another matter of importance which will be attended to during 1930 is that of ocean



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Congress Likely to Talk Much but Do Little

mail contracts. The latest development is announcement by the interdepartmental ocean mail committee, which was appointed by the President shortly after he was inaugurated, that some 29 ships are to be built at a cost of about $175,000,000. This will mean the opening up of 13 new ocean mail routes. It is suggested that the Jones-White law be clarified.

Publication by the interstate commerce commission of its long delayed plan for consolidation of the railroads of the United States into a number of systems, which it was directed to prepare by the transportation act of 1920, is expected to have a clarifying effect which may enable many railroads to proceed with confidence with plans for improvements or expansion programs.

There are numerous good-sized railroads which for nearly ten years, particularly since the commission promulgated its tentative consolidation plan in 1921, calling for 19 or 20 large systems, have been expecting sooner or later to be absorbed into one or the other of the contemplated great systems. During the period of uncertainty they have been unable to a large extent to plan definitely for the future. Likewise, many of the larger railroads that are expected to become the nuclei for still larger systems have been hampered.

President Hoover—a Quaker who can "Talk Big" when occasion arises

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Department of Justice Cautious

It seems apparent from utterances made recently by Attorney General William D. Mitchell that business will not receive as lenient co-operation from his department as to the anti-trust laws as under Mr. Coolidge.

The attorney general takes the stand that even in the guarded language used by the last administration when it was asked about a proposed merger that the department's attitude often was "misrepresented and misconstrued."

When business asks the department of justice for an opinion on a proposed merger the attorney general says "if the proposal seems to involve a violation of law we will so state to those interested." "If the proposal," he continues, "while not clearly involving a law violation, comes so close to the line that we feel it would be necessary to invoke the judgment of the courts in case the proposal is executed, we so advise those interested.

"If the proposal does not appear to involve a violation of law but the matter is complicated and involves an intricate inquiry into facts which we have not the facilities to make in advance or if there is room for any doubt or difference of opinion as to the validity of the proposed transaction, we shall decline to express any opinion about it or to give any intimation that the department will refrain from legal proceedings, and reserve full liberty of action. Only in the clearest case will letters of advice be issued to the effect that no legal proceedings are likely to be instituted."

The federal trade commission has now adopted a policy on trade practice conferences which it is continuing in 1930. It is the belief of the majority of the members of the commission that more good is being done by these conferences, which have been adopted by many of the major industries, than by the many years of complaints which have been issued against individual companies since the commission was organized.

Under the early system adopted by the commission no company was aware of any action by the commission until it was notified through the public press that a complaint had been issued against it by the commission. At present a company is given an opportunity to appear before the board of review of the commission before any outsider knows that a complaint has been or will be issued. If the company can show just cause, the complaint can be quashed without publicity.

There is every indication that this year these trade practice conferences will be continued. They are evidently satisfactory to the administration, for President Hoover has been in office long enough to put a stop to them if he desired.

American industry appears to be ready for a vigorous advance in 1930, and to that movement the department of commerce hopes to be able to give added impetus, through the heightened activity of its whole organization.

The iron and steel division of the department will expand the service that it renders to these specific industries, carrying out surveys of overseas markets, and in addition giving attention to the competition of foreign steelmakers within the United States. The monthly statistical service will be enlarged. There will be new studies of the possibilities abroad for greater sales of American products. With respect to all standard iron and steel products, the trade promotive effect will be intensified. In the field of domestic business, the department will try to aid American industry by demonstrating ways in which the existing "distribution losses" may be eliminated or reduced. To aim sledge hammer blows at the admittedly enormous wastes that occur today between the factory door and the ultimate consumer is one of the department's major purposes. The elaborate census of distribution to be carried out in 1930 should provide a wealth of valuable data.

Preventive Data Also Sought

In co-operation with the consular service, comprehensive data as to the activity and resources of thousands of prospective customers for American goods will be gathered in foreign countries, and the resulting information, which has proved so valuable in the past, will be made available.

For the most part, the department's service in the foreign field will be directly promotive, but preventive information will also be supplied, data designed to prevent American industries from trying to cultivate barren markets or from employing inept and ill-advised sales methods.

Thus, the department of commerce hopes in 1930 to play its part in that sturdy forward movement of American industry which has been initiated at the recent Washington business conferences under the inspiration of President Hoover.

Primary Iron and Steel Producers Make 1929 Mergers Commanding

New Financial Control, Patents, Water Outlets and Competitive Parity Link Most Tonnage in 29 Years—Users Also Interlock

MORE primary iron and steel capacity was merged in 1929 than in any year since the United States Steel Corp. was put together in 1901. Among consumers of iron and steel, principally the metal-working, fabricating and machinery groups, the trend toward amalgamation was as pronounced as in 1928—perhaps more so if gaged by a preponderance of important names.

Most cogent of all reasons for this significant drift toward unity among producers of basic materials was the new type of management which has taken hold of the industry, best described as financial or pecuniary management, in which the so-called investment trusts have played a major role.

The desire to integrate—which in the long view is practically synonymous with self-preservation, the growing importance attached to patent rights, the will to checkmate competition, the necessity for strategic shipping points and the conviction that wages and employment must be stabilized supplied impulse.

Fourth Quarter Is Culmination

It is noteworthy that the first three quarters of the year was a period of discussion and negotiation, punctuated by rumors of impending consolidations, while the fourth quarter was a period of consummation.

In rounding out the Republic Iron & Steel Co., an operation initiated in 1928 when the Trumbull and Steel & Tube properties were acquired, practically all of the factors influencing the merger movement in 1929 were brought into play.

In April, Cyrus S. Eaton, of Cleveland, and his associated financial interests, including the investment trust — Continental Shares Inc. — bought heavily into the Bourne-Fuller Co. In September this group bought control of the Donner Steel Co., Buffalo, which in November took over the Witherow Steel Corp., Pittsburgh.

October witnessed the purchase of the Interstate Iron & Steel Co., Chicago, by the Central Alloy Steel Corp., Canton and Massillon, O. Later in the month the Republic company got control of the Union Drawn Steel Co., Beaver Falls, Pa., meanwhile buying a half interest in the Fritz-Moon Tube Co., Butler, Pa. Then in December the Republic and Central Alloy and Donner companies, with their acquisitions, and the Bourne-Fuller Co., were brought together.

Republic Gets Pipe Patents

In the Steel & Tubes purchase the Republic company had acquired valuable rights to a process for electrically welding steel pipe, supplemented in the smaller sizes by a process taken over from the Fritz-Moon company. The Union Drawn company provided a large outlet for bars. The Interstate plants at Chicago and the Donner plant at Buffalo, both companies being on the lakefront, fortified Central Alloy's position in the alloy field.

The Witherow property brought to the consolidation important patents for die rolling and a big automotive forging business. The contribution of the investment trust was a noteworthy financial connection, the executive and technical assistance of two important iron and steel men, and ore reserves.

In the Republic merger was involved assets totaling $350,000,000 and annual capacity for 2,900,000 gross tons of pig iron and 4,900,000 tons of steel ingots. Second only to this grouping was the marriage of the Weirton Steel Co., Weirton, W. Va., the Great Lakes Steel Corp., Detroit, and certain subsidiaries of the M. A. Hanna Co., Cleveland, the assets totaling $120 000.000 and the annual capacities 1,760,000 tons of pig iron and 2,000,000 tons of steel ingots.

To this concentration the Great Lakes corporation supplied a valuable site and an open-hearth plant and strip mill in process of construction, the Weirton company one of the largest strip businesses in the country, and the Hanna company strategic blast furnaces, coke oven properties and iron ore reserves.

Paralleling these two major movements in steel in the Middle West was the union of all the strictly merchant blast furnaces, having neither a steelworks or interplant connection, on the American side of the Great Lakes. Into this grouping went the two merchant stacks of the Toledo Furnace Co. at Toledo, O., the two Federal furnaces of the By-Products Coke Corp. at Chicago, one stack each by the Zenith Furnace Co., Duluth, and the Perry Iron Co., Erie, Pa., with important related by-product coke and iron ore properties.

After several months of negotiation, the United States Steel Corp. acquired the Columbia Steel Corp. properties on the Pacific coast, giving it blast furnace, open-hearth steel and finishing capacity. This was the first purchase of a going iron and steel plant by the Steel corporation since it took over the Tennessee Coal, Iron & Railroad Co. in 1907.

Coast Situation Is Balanced

Within sixty days, the Bethlehem Steel Corp., largest independent, bought the Pacific Coast Steel Co. and the Southern California Iron & Steel Co., thereby to a great extent balancing the situation in the coast markets.

Six important makers of refractories combined to form the North American Refractories Co., Cleveland. The Alan Wood Iron & Steel Co. and the Rainey-Wood Coke Co. went together as the Alan Wood Steel Co. The Allegheny Steel Co. absorbed the West Penn Steel Co. The Commonwealth Steel Co. was bought by the General Steel Castings Corp.

The Lamson & Sessions Co., Cleveland, took over the Lake Erie Bolt & Nut Co. and American Bolt Co., Joseph T. Ryerson & Son Inc. entered Philadelphia warehouse market with the acquisition of the Penn-Jersey Steel Co. The Chrome Alloy Products Inc. went to the Midvale Co. Cooper-Bessemer Corp. was formed by the C. & G. Cooper Co. and the Bessemer Gas Engine Co. On the west coast the Baker, Llewellyn and Union Iron Works merged into the Consolidated Steel Corp.

Among Business Changes in 1929

PIG IRON

Interlake Iron Corp.	Formed by merger of Toledo Furnace Co., By-Products Corp., Perry Iron Co., Zenith Furnace Co. and related iron ore, coke and coal properties.

STEEL

Alan Wood Steel Co.	Formed by purchase of Alan Wood Iron & Steel Co. and Rainey Wood Coke Co. by Koppers Co. and W. J. Rainey Inc.
Allegheny Steel Co.	Purchases West Penn Steel Co.
Bethlehem Steel Corp.	Purchases Pacific Coast Steel Co. and Southern California Iron & Steel Co.
Central Alloy Steel Corp.	Purchases Interstate Iron & Steel Co.
Corrigan, McKinney Steel Co.	Takes over N. & G. Taylor Co.
Donner Steel Co.	Purchases Witherow Steel Corp. (Includes also Dilworth, Porter & Co.)
National Steel Corp.	Formed by merger of Great Lakes Steel Corp., Weirton Steel Co. and certain subsidiaries of M. A. Hanna Co.
Republic Iron & Steel Co.	Purchases Union Drawn Steel Co.
Republic Iron & Steel Co. and Spang, Chalfant & Co.	Purchase Fritz-Moon Tube Co.
Republic Steel Co.	Formed by merger of Republic Iron & Steel Co. (including Union Drawn Steel Co.), Central Alloy Steel Corp. (including Interstate Iron & Steel Co.), Donner Steel Co. (including Witherow Steel Corp.) and Bourne-Fuller Co.
United States Steel Corp.	Purchases Columbia Steel Corp.
Wheeling Steel Corp.	Purchases Tyler Tube & Pipe Co.

METALWORKING, MACHINERY, FABRICATING

Allis-Chalmers Mfg. Co.	Purchases LaCrosse Plow Co.
American Radiator & Standard Sanitary Corp.	Formed by merger of American Radiator Co. and Standard Sanitary Mfg. Co.
Barnes-Gibson-Raymond, Inc.	Purchases Cook Spring Co.
Berger Mfg. Co.	Purchases metal furniture division of Van Dorn Iron Works Co.
Blaw-Knox Co.	Purchases Union Steel Castings Co., Lewis Foundry Machine Co., National Alloys Steel Co., A. W. French & Co. and Pittsburgh Rolls Corp.
Borg-Warner Corp.	Purchases Long Mfg. Co., Norge Co. and Detroit Gear & Machine Co.
Canda-Gayley Steel Corp.	Purchases Chrome Steel Works
Capitol Steel & Iron Co.	Purchases Oklahoma Structural Steel Co.
Consolidated Steel Corp.	Formed by Llewellyn Iron Works, Baker Iron Works and Union Iron Works
Cooper-Bessemer Corp.	Formed by merger of C. & G. Cooper Co. and Bessemer Gas Engine Co.
Cutler-Hammer Inc.	Formed by Cutler-Hammer Mfg. Co., Cream City Foundry Co. and Cutler-Hammer Co.
Empire Steel Casting Co. and Fafnir Bearing Co.	Purchase Railway Motors Corp.
Farm Implement & Tractor Mfg. Corp.	Formed to acquire part of business of Minneapolis Steel & Machinery Co.
Federal Screw Works	Purchases Superior Screw & Bolt Mfg. Co., Chelsea Screw Co. and Michigan Screw Co.
Fleming Mfg. Co.	New name for Fleming Structural Steel Co.
Food Machinery Corp.	Formed to acquire Cutler Mfg. Co., Anderson Barngrover Mfg. Co., John Bean Mfg. Co., Sprague-Sells Corp., Stabler-Parker Co. and Florida Citrus Machinery Co.
General Steel Castings Corp.	Purchases Commonwealth Steel Co.
Goslin-Birmingham Mfg. Co. Inc.	Formed by merger of Birmingham Machine & Foundry Corp. and Joubert & Goslin Machine & Foundry Co.
Heppenstall Co.	New name for Heppenstall Forge & Knife Co.
Houdaille, Hershey Corp.	Formed to merge Houdaille Corp., Hershey Corp. and Oakes Products Corp.
Industrial Brownhoist Corp.	Purchases McMyler-Interstate Co.
International Derrick & Equipment Co.	Purchases Boykin Machinery & Supply Co.
Jeffrey Mfg. Co.	Purchases Galion Iron Works & Mfg. Co.
Kalman Steel Co.	Purchases Baker Steel Co.
Lamson & Sessions Co.	Purchases Lake Erie Bolt & Nut Co. (including previous purchase of American Bolt Co.)
Lamb-Grays Harbor Co.	Purchases Raymond Foundry & Machine Co.
Michigan Products Corp.	Purchases Chrobaltic Tool Co. and Sheet Steel Products Co.
Midland Engineering Co.	Formed by bond holders of McMyler-Interstate Co.
Midvale Co.	Purchases Chrome Alloy Products Inc.
Mullins-Gilson Mfg. Co.	Formed by merger of Mullins-Gilson Co. and Rushville Foundry Co.
National-Erie Co.	Purchases Williams Foundry & Machine Co.
New York Car Wheel Co.	Purchases Brown Car Wheel Works
North American Refractories Co.	Formed to consolidate Ashland Fire Brick Co., Farber Fire Brick Co., Queens Run Refractories Co. Inc., Elk Fire Brick Co., Dover Fire Brick Co. and Crescent Refractories Co.
Oliver Farm Equipment Co.	Formed by merger of Hart-Parr Tractor Co., Oliver Chilled Plow Works, Nichols & Shepard Co., American Seeding Machine Co.
Oster Mfg. Co.	Merges with Williams Tool Corp. with no change in names.
Outboard Motor Corp.	Formed by Evinrude Motor Co., Elto Outboard Co. and Lockwood Motor Co.
Pittsburgh Screw & Bolt Co.	Formed by Pittsburgh Screw & Bolt Corp., Colona Mfg. Co. and Graham Bolt & Nut Co.
Pittsburgh Steel Foundry Corp.	Purchases Sharon Foundry Co.
Pressed Steel Tank Co.	Purchases Seamless Steel Products Corp.
Pullman Inc.	Merging Pullman Car & Mfg. Corp., Standard Steel Car Co. and Osgood-Bradley Car Co.
Ryerson, Joseph T., & Son Inc.	Purchases Penn-Jersey Steel Co.
Seneca Wire & Mfg. Co.	Purchases Wheeldon Wire Co.
Shepard-Niles Crane & Hoist Corp.	Formed by merger of Shepard Electric Crane & Hoist Co. and Niles Crane Corp.
Spicer Mfg. Corp.	Purchases Brown-Lipe Gear Co.
Stacey Engineering Co.	Purchases Stacey Bros. Gas Construction Co., Connersville Blower Co., and Willbraham-Green Blower Co.
Taylor Forge & Pipe Works	New name for American Spiral Pipe Works
Thompson Products Corp.	Formed by merger of Cleveland & Mfg. Co. and Cox Tool Co.
Timken-Detroit Axle Co.	Purchases Wisconsin Parts Co.
United States Pipe & Foundry Co.	New name for United States Cast Iron Pipe & Foundry Co.
Wallace Steel & Supply Co.	New name for Wallace Foundry & Steel Co.
Wheeling Structural Co.	New name for Moss Iron Works.
Wrought Iron Co. of America.	Formed by merger of Lebanon Iron Co. and Scranton Bolt & Nut Co.
Yale & Towne Mfg. Co.	Purchases Stuebing Cowan Co.

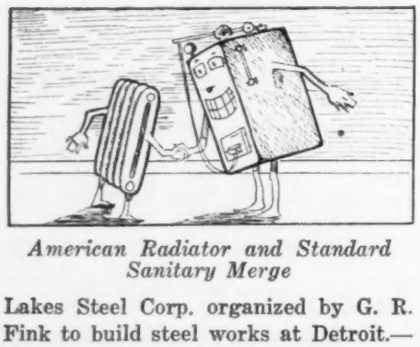
1929 Business Diary

—JANUARY—

STEEL consumption analysis reveals automotive industry premier steel consumer. — Taylor Allderdice resigns as president of National Tube Co.; succeeded by Fred W. Waterman.—A. E. Blackwood made president of Sullivan Machinery Co.—O. P. Briggs, founder, Minneapolis Steel & Machinery Co.; Mathew Andrews, chairman, M. A. Hanna Co.; David M. Weir, vice president, Weirton Steel Co.; Harry Coulby, partner, Pickands, Mather & Co., F. L. Sivyer, Sivyer Steel Castings Co., die.—Koppers Co. and W. J. Rainey Inc. buy Alan Wood Iron & Steel Co.—Six refractory makers merge as North American Refractories Co.—Shepard Electric Crane & Hoist Co. and Niles Crane Co. merge as Shepard-Niles Crane & Hoist Corp.—Witherow Steel Corp. buys Dilworth, Porter & Co.—G. M. Humphrey made president of M. A. Hanna Co.—Industrial furnace manufacturers organize.

—FEBRUARY—

AMERICAN RADIATOR CO. and Standard Sanitary Mfg. Co. merge as American Radiator & Standard Sanitary Mfg. Corp.—Great

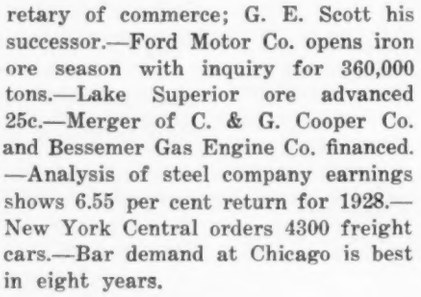


American Radiator and Standard Sanitary Merge

Lakes Steel Corp. organized by G. R. Fink to build steel works at Detroit.—United States Steel Corp. decides to increase common shares, retire bonds.—Kalman Steel Co. buys Baker Steel Co., Detroit.—Berger Mfg. Co. buys metal furniture division of Van Dorn Iron Works Co.—Pittsburgh Screw & Bolt Co. buys Graham Bolt & Nut Co.—Ground broken for A. M. Byers Co. at Ambridge, Pa.—B. L. Sommer, president, Middle States Steel & Wire Co.; W. C. Runyon, former president, Struthers Furnace Co.; W. L. Hoffman, William L. Hoffman Co.; B. T. Bechtel, Chicago sales manager, Youngstown Sheet & Tube Co., and Samuel Wylie Miller, Union Carbide & Carbon Research Laboratories, die.—Aston process for making wrought iron mechanically is described.—Forging Manufacturers' association organized.—Steelmakers announce $1 and $2 advances for second quarter.—C. H. Hadly resigns as president of Alan Wood Iron & Steel Co.

—MARCH—

HERBERT HOOVER first engineer to be inaugurated president.—R. P. Lamont, president, American Steel Foundries, made sec-



Railroad Equipment Purchases Big

retary of commerce; G. E. Scott his successor.—Ford Motor Co. opens iron ore season with inquiry for 360,000 tons.—Lake Superior ore advanced 25c.—Merger of C. & G. Cooper Co. and Bessemer Gas Engine Co. financed.—Analysis of steel company earnings shows 6.55 per cent return for 1928.—New York Central orders 4300 freight cars.—Bar demand at Chicago is best in eight years.

—APRIL—

J. L. SUSSMAN resigns presidency of Steel & Tubes Inc.—J. F. Lincoln made president of Lincoln Electric Co.—J. A. Farrell receives first award of Gary medal from American Iron and Steel institute.—Industrial Brownhoist Corp. buys McMyler-Interstate Co.—Anthony C. Kloman, former associate of Andrew Carnegie; Julian Burdick, president, West Penn Steel Co.; and Edward F. Carry, president, Pullman Co., die.—Hart-Parr Tractor Co., Oliver Chilled Plow Works and Nichols & Shepard Co. merge as Oliver Farm Equipment Co.—American Rolling Mill Co. licenses United States Steel Corp. to use continuous sheet rolling process.—Davison Coke & Iron Co. leases Cherry Valley and Claire stacks.—Cleveland-Cliffs Iron Co. and Eaton interests form alliance.—Superior Steel Corp. passes to new control.

—MAY—

ALLEGHENY STEEL CO. absorbs West Penn Steel Co.—Bill revising tariff introduced in house and passed.—E. T. Sproull resigns vice presidency of National Association of Flat Rolled Steel Manufacturers and buys

Revised Tariff Bill Introduced

J. W. Brainard Steel Co.—Scrap industry adopts code of ethics.—David A. Crawford elected president of Pullman Co.—Hugh Kennedy, president, Seneca Iron & Steel Co., dies.—G. R. Hanks elected president of Taylor-Wharton Iron & Steel Co.—Neville island base on pig iron established.—Basic iron advanced 50 cents in Valleys.

—JUNE—

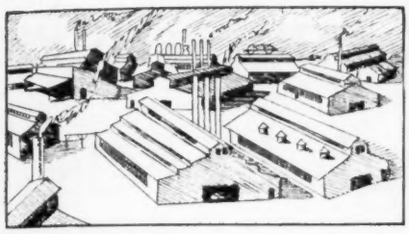
INTERSTATE COMMERCE COMMISSION decrees mileage scale rate for iron and steel products.—W. R. Warner, founder of Warner & Swasey Co., and C. F. Brush, scientist, die.—F. A. Merrick made president of Westinghouse Electric & Mfg. Co.—E. L. Ryerson Jr. made president of Joseph T. Ryerson & Son Inc.—May daily pig iron and steel ingot rates announced as alltime records.—Arbitrators award E. Arthur Tutein $302,500 damages against Hudson Valley Coke & Products Corp.—Institute of

REFLECTS EVENTFUL YEAR

Boiler and Radiator Manufacturers organized.—Gray Iron institute announces standard sales agreement and trade customs.

—JULY—

ILLINOIS STEEL CO. announces huge expansion plans for Gary and South Chicago.—Record award of 191,000 tons for steel pipe line, Texas



Huge Plant Expansion Plans Announced

to Chicago, made to A. O. Smith Corp.—Henry Ford sells D. T. & I. railroad.—A. A. Stevenson retires as vice president, Standard Steel Works Co.—R. W. Clark, vice president, Chateaugay Ore & Iron Co.; William Pigott, chairman, Pacific Coast Steel Co.; and L. W. Penfield, former president, Hadfield-Penfield Steel Co., die.—Yale & Towne Mfg. Co. buys Stuebing Cowan Co.—Tarentum Steel Corp. organized.—Metalware institute formed.—Southern iron offered in North as low as $13.

—AUGUST—

LAKE ERIE BOLT & NUT CO. buys American Bolt Co.—Blaw-Knox Co. completes purchase of Union Steel Castings Co., Lewis Foundry & Machine Co. and National Alloys Steel Co.—C. M. Easterly made vice president of Canton Rolling Mills Corp.—K. L. Griffith made president of Seneca Iron & Steel Co.—H. S. Pickands, partner, Pickands, Mather & Co.; John D. Hurley, president, Independent Pneumatic Tool Co.; and Roland Gerry, formerly with Jones & Laughlin Steel Corp., die.—Stacey Engineering Co. organized to acquire Stacey Bros. Gas Construction Co., Connersville Blower Co. and Wilbraham-Green Blower Co.—Austin Co. awarded contract for Russian Ford plant.—Laclede Steel Co. announces tube mill for Alton, Ill.—Austin Co. awarded contract for auto plant and city in Russia.—Fritz-Moon Tube Co., Butler, Pa., bought by Republic Iron & Steel Co. and Spang, Chalfant & Co.

—SEPTEMBER—

DONNER STEEL CO. bought by Continental Shares.—Charles M. Schwab begins 50th year in steel industry.—James A. Campbell tendered dinner on 75th birthday.—Buffalo and Cleveland made cold finished bar bases.—H. Cole Estep, vice president, Penton Publishing Co., dies.—American Institute of Steel Construction finds steel buildings 2000 feet high possible.—R. G. Guthrie nominated for president of A. S. S. T.—R. S. Cooper made president of Independent Pneumatic Tool Co.—Merger of Weirton Steel Co., Great Lakes Steel Corp. and M. A. Hanna Co. subsidiaries as National Steel Corp. decided.—Railroads begin placing 1930 track material unusually early.—Large purchases of Russian manganese ore are made.

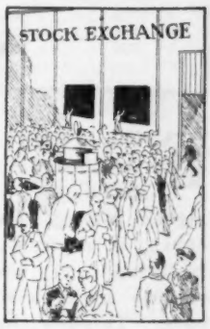
2000-foot buildings found possible

—OCTOBER—

RALPH MODJESKI awarded 1930 John Fritz medal.—Central Alloy Steel Corp. buys Interstate Iron & Steel Co.—Republic Iron & Steel Co. buys Union Drawn Steel Co.—United States Steel Corp. buys Columbia Steel Corp.—John C. Williams elected president of Weirton Steel Co.—T. M. Girdler and R. J. Wysor leave Jones & Laughlin Steel Corp. for Continental Shares Inc.—Jay C. McLauchlan, partner, Pickands, Mather & Co., dies.—Ford Motor Co. closes on 32,000 tons of pig iron for immediate water shipment.

—NOVEMBER—

LAMSON & SESSIONS CO. buys Lake Erie Bolt & Nut Co.—Donner Steel Co. buys Witherow Steel Corp.; W. P. Witherow made chairman of Donner and Floyd K. Smith president.—Steel Corp. and Bethlehem wide-flange beam patent case ended by former taking out license.—Structural steel fabricators adopt trade practice code.—Interstate commerce commission postpones effective date for mileage scale to March 20.—Receiver appointed for Belfont Steel & Wire Co.—S. B. Sheldon, president, Minnesota Steel Co., and William Liston Brown, of Pickands, Brown & Co., die.—Heavy losses sustained in stock market break.



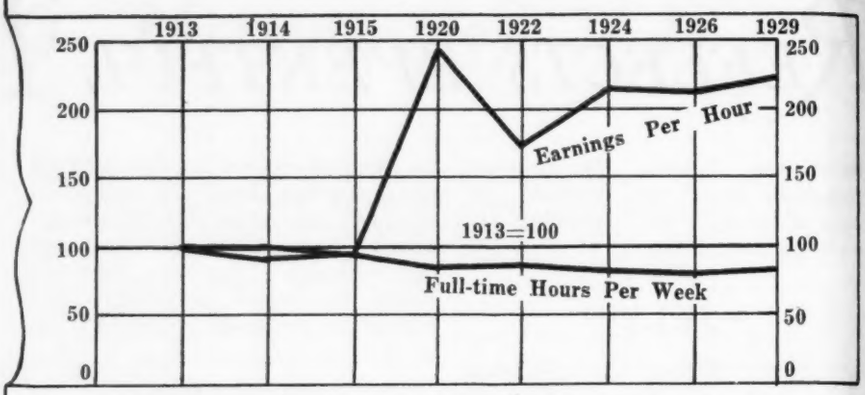
Stocks Crash

—DECEMBER—

PICKANDS, MATHER & CO. merges Toledo Furnace Co., By-Products Coke Corp., Zenith Furnace Co., Perry Iron Co. and related iron ore, coke and coal properties as Interlake Iron Corp.—Bethlehem Steel Co. buys Pacific Coast Steel Co. and Southern California Iron & Steel Co.—James A. Campbell made chairman of Youngstown Sheet & Tube Co., Frank Purnell president.—Henry Ford raises wages $1 per day.—Corrigan, McKinney Steel Co. buys N. & G. Taylor Co.—L. C. Reis made president Minnesota Steel Co.—J. A. Farrell tells President steel will spend $500,000,000 on improvements.—Republic, Central Alloy, Donner and Bourne-Fuller companies merged by Continental Shares.

Hours and Wages in Iron and Steel

	Full-time hours per week	Earnings per hour
Blast furnaces:		
1913	76.9	$0.205
1926	59.8	.517
1929	60.7	.528
Open-hearth furnaces:		
1913	76.7	$0.237
1926	57.1	.677
1929	57.7	.714
Bessemer converters:		
1913	70.0	$0.284
1926	52.6	.641
1929	53.7	.643
Bar mills:		
1913	61.5	$0.288
1926	54.7	.591
1929	55.6	.625
Standard rail mills:		
1913	70.9	$0.254
1926	55.5	.595
1929	56.0	.628
Sheet mills:		
1913	52.3	$0.483
1926	48.9	.759
1929	48.9	.793
Tin plate mills:		
1913	46.1	$0.417
1926	48.1	.704
1929	47.4	.732
Puddling mills:		
1913	53.2	$0.328
1926	52.1	.657
1929	50.3	.686
Blooming mills:		
1913	73.0	$0.265
1926	54.2	.627
1929	55.0	.666
Plate mills:		
1913	69.9	$0.255
1926	55.8	.606
1929	58.0	.639



Average hourly earnings in ten departments of iron and steel manufacture, and composite showing the trend of earnings and of full-time hours

Employment and Wages Hold to High Levels

Work and Payrolls Highest in Three Years, Mitigating the Effect of Year-end Letdown—Earnings Advancing in Iron and Steel

EMPLOYMENT in the iron and steel and related industries ended the year 1929 with a higher average than with which it began, in contrast with other manufacturing lines, which closed with a slightly lower average than in January. Through the entire year, iron and steel enjoyed a generally high level of employment, the same as other manufactures, so that the influence of the year-end letdown was much less noticeable than in 1928.

The bureau of labor's statistical index shows employment in iron and steel and their products averaged 99.7 for the first 11 months of 1929, compared with 91.5 for 1928, 93.2 for 1927 and 100 for 1926. With the exception of 1926 the index for 1929 was at the highest point since 1923. It was above the average yearly index of the six years, 1923-1928. Employment during the second and third quarters averaged 101.6.

The comparable index for 1929 in general manufacturing lines was 97.9, compared with 93.8 in 1928, 96.4 in 1927 and 100 in 1926.

The payroll index for iron and steel and their products in 1929 was the highest in six years, except for the year 1926. It was 97.9, compared with 93.8 in 1928, 96.4 in 1927 and 100 in 1926. During the greater part of 1929, the iron and steel payrolls were considerably higher than in 1926. General manufacturing lines for 1929 show a payroll index of 101.1, compared with 94.5 in 1928, 96.5 in 1927 and 100 in 1926.

The remarkable feature of employment and wage payments, reviewed over a period of six years, is their generally high and steady averages, and the tendency of wage rates in certain manufacturing industries to advance, rather than decline.

Earnings Rise, Hours Fall

Hourly earnings in iron and steel manufacture stood at an average of 67.4 cents in 1929. This was 3.7 cents an hour higher than in 1926, though 7 cents less than in the peak year 1920. As compared with 1913, the 1929 average represented an increase of 122 per cent. The earnings for the respective departments are set forth in the accompanying table, while the composite for all departments is presented in the graph. This also presents the composite for full-time hours per week, showing the gradual decline, in contrast with upward trend of earnings.

Full-time weekly earnings for the ten departments in 1929 stood at an average of $36.48, representing an increase of 6 per cent over 1926, and of 93 per cent over 1913.

Although the average full-time working week in iron and steel manufacture was two-tenths of an hour longer in 1929 than in 1926, the present working week is less than in any year prior to 1926, and almost 12 hours, or 17 per cent, below 1913.

Wages in bar iron mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers were slightly higher in 1929 than in 1928, reflecting a better price average for bar iron. Puddlers are receiving $11.80 a ton, compared with $11.55 a year ago, $18.76 at the postwar peak, and an average of $5.60 for 1914. The bureau of labor statistics reports average hourly earnings in bar mills in 1929 as 62.5 cents, 3.4 cents higher than in 1926.

Wage rates in sheet and tin plate

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IRON TRADE REVIEW

Vol. 86, No. 1 The Yearbook of Industry Jan. 2, 1930

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The Business Trend

Automobile Industry Watched For Trend

By JOHN W. HILL, Financial Editor

THE year 1929 was one of great industrial activity and general business prosperity. This fact cannot be marred by the receding tendencies which developed in the closing months. Outputs and earnings will disclose new high records in many important lines for the year.

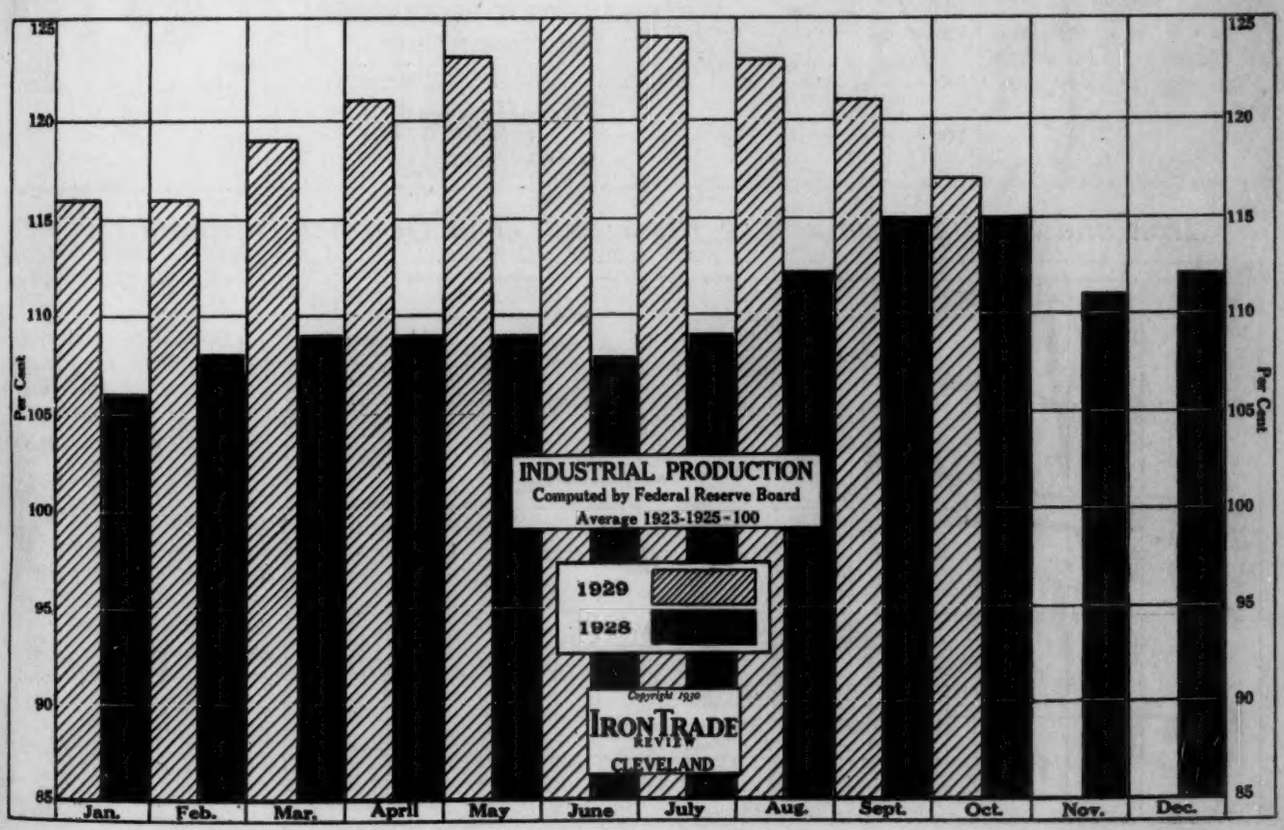
UNLIKE many periods of exceptional prosperity, the year did not give rise to the symptoms usually associated with great business activity and which inevitably lead to a collapse requiring many months to mend. The stock market indulged in a speculative spree, but business did not. Over-buying, general overproduction, price inflation—these and similar noxious growths on prosperity were absent in the main.

THE automobile industry is the conspicuous exception to the generalization that there has been no serious overproduction. More cars and trucks were turned out than the domestic or foreign markets could absorb.

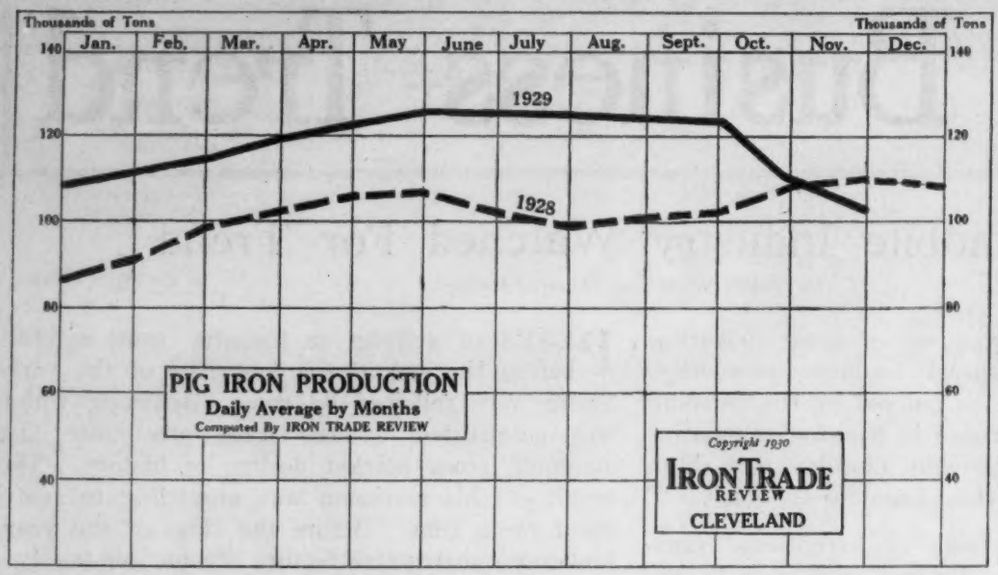
PEAKS of activity in industry were reached before the end of the first half of the year. These were followed by some slackening which was accelerated by the most precipitate and sweeping stock market decline in history. The result of this recession was unsettling to sentiment for a time. Before the close of the year, however, constructive factors became dominant.

WHITE HOUSE conferences with business leaders of the nation brought to light the fact that railroads, public utilities and many industrial enterprises were planning huge expenditures for improvement and expansion in 1930.

THESE developments helped to abolish unfounded fears regarding the outlook. The recession has been sharp, but there are no indications that it will be extended. Already signs of moderate recovery have appeared in a few key lines. Revival seems likely to gather gradual momentum as 1930 advances.



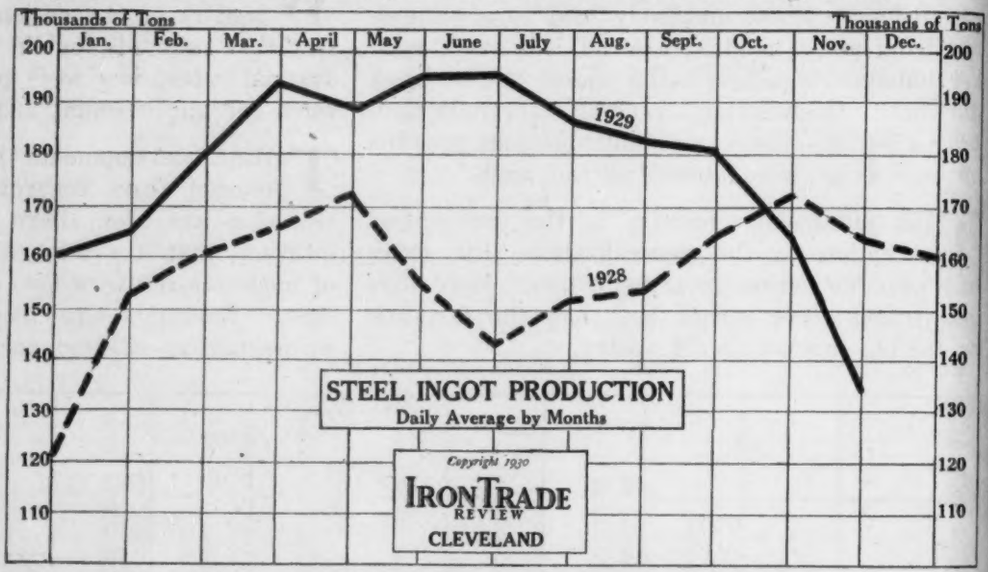
Pig Iron Production Makes Substantial Increase Over Year Before



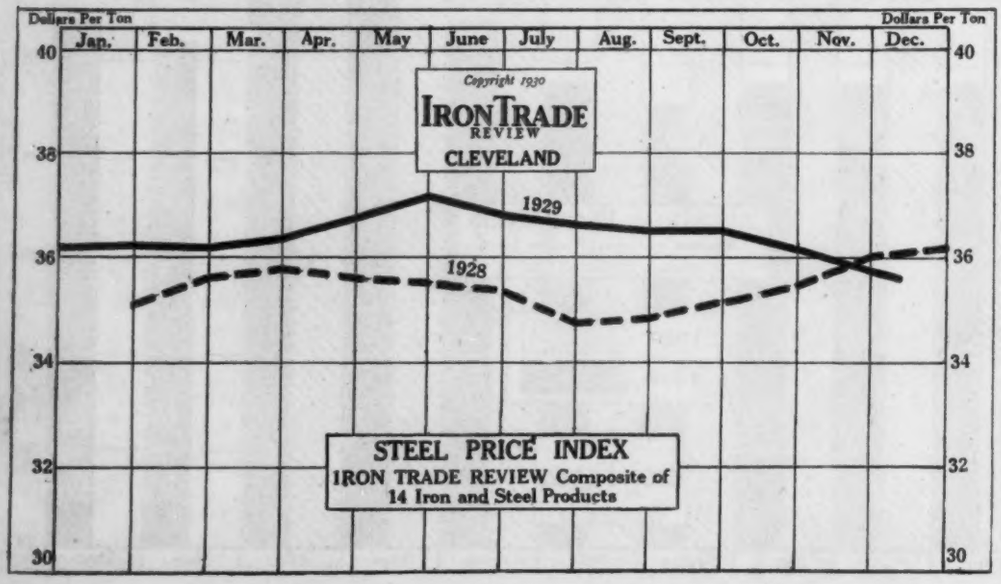
PRELIMINARY estimates of production of coke pig iron in 1929 indicate a total of 42,400,000 tons. This compares with a total of 37,838,224 tons in 1928 and with 36,289,112 tons in 1927, and was a new peak for all time. The high month for the year was in May with an average of 125,700 tons, and the decline from that point was gradual the rest of the year.

Steel Ingot Output Soars To New Peak For All Time During 1929

THE past year brought another new record of output of steel ingot and castings, the estimated total being 56,095,000 tons. This compared with 51,544,180 tons for all of 1928, the previous year's record. Average operations of open-hearth and bessemer furnaces the first 11 months of the year was 91.4 per cent of capacity. The year's peak was in May and June.



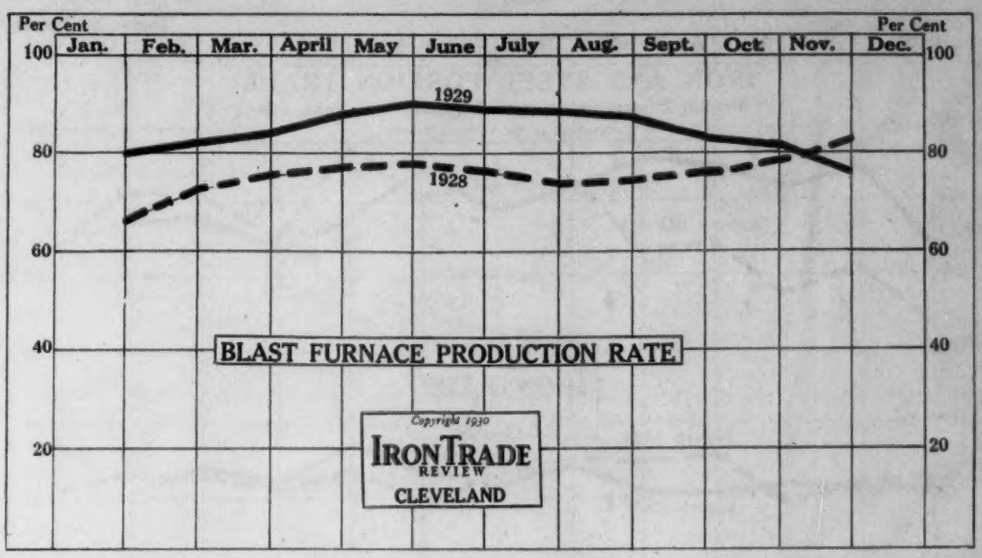
Iron and Steel Price Average Rises and Then Declines During 1929



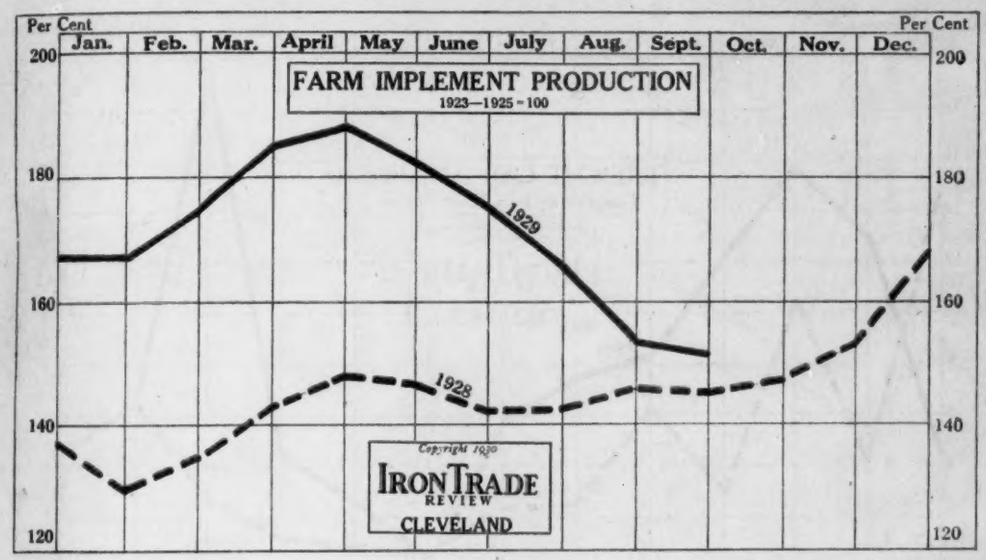
DURING November the IRON TRADE REVIEW *composite market average of 14 iron and steel products dropped below the level of 1928 for the first time in 1929, the index standing at $35.95 in December. However, the decline from the peak of the year was only 3 per cent notwithstanding the sharp recession in operations. The mild degree of price increase reflects lack of inflation.*

Blast Furnace Production Rate Clings To High Level In Past Year

THE rate of blast furnace operations in 1929 was consistently higher than during the preceding year, until November. In that month production of blast furnaces dropped to 77 per cent of capacity compared with 81 per cent in November, 1928. The peak was reached in May, when production of pig iron was 91 per cent of capacity. In November operations dropped sharply.



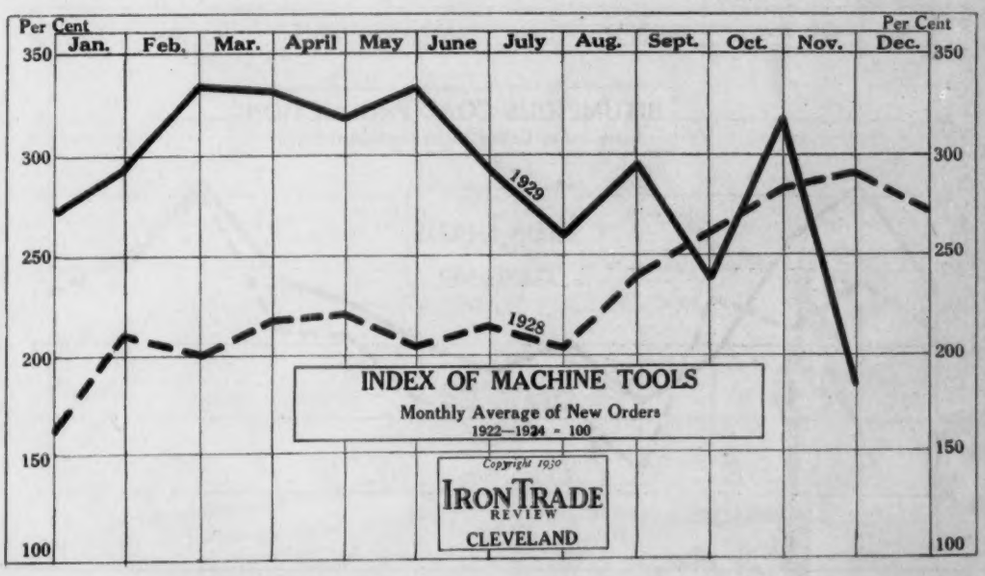
Farm Implement Demand Reached Peak in April and Then Receded



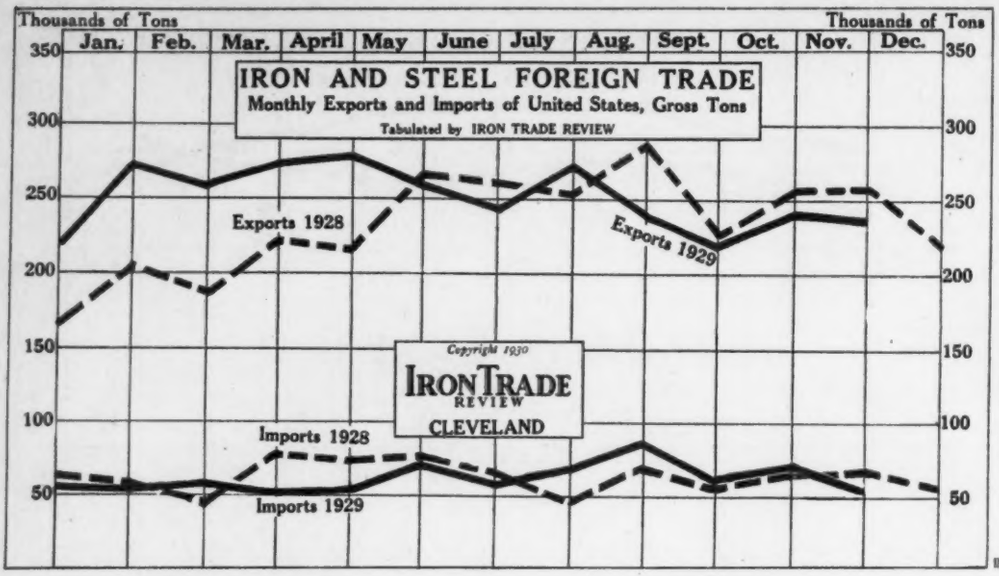
THE increase in farm implement production in the first four months of the year was not held in succeeding months. In April production had increased to 187 per cent of the 1923-25 average. From that point the decline was steady, compared with the rising tendency which became noticeable late in 1928. The total value of 1929 crops was about $12,000,000,000.

Machine Tool Orders Mounted to Boom Time Levels During 1929

THE year 1929 was a period of extraordinary activity in the machine tool industry. The monthly average of new orders computed by the National Machine Tool Builders' association reached a peak of 336 in February. There was some decline in July and September, but in October there was another sharp gain. The October index was 322. This was followed by a decrease.



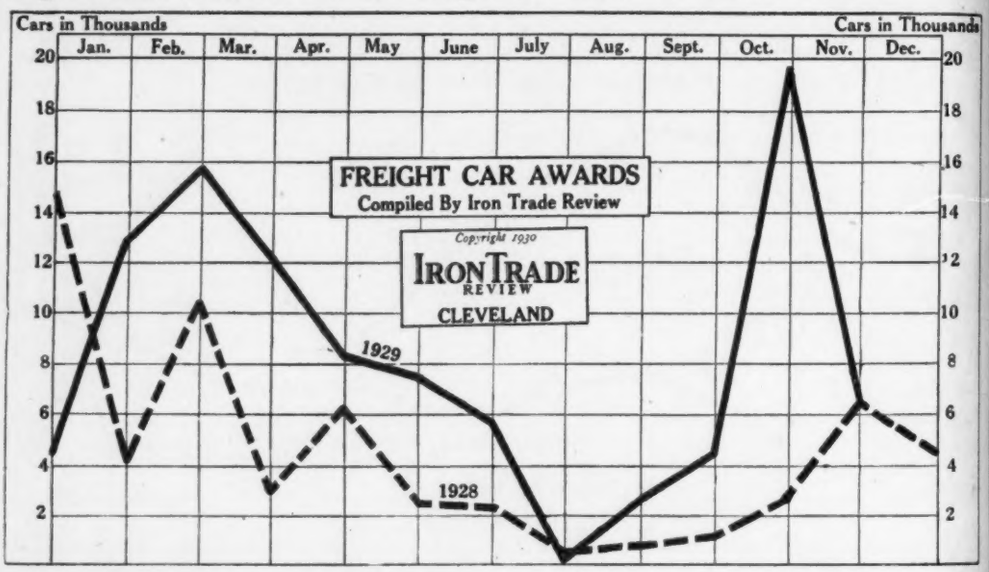
Iron and Steel Exports in 1929 Ran Ahead of Those for 1928



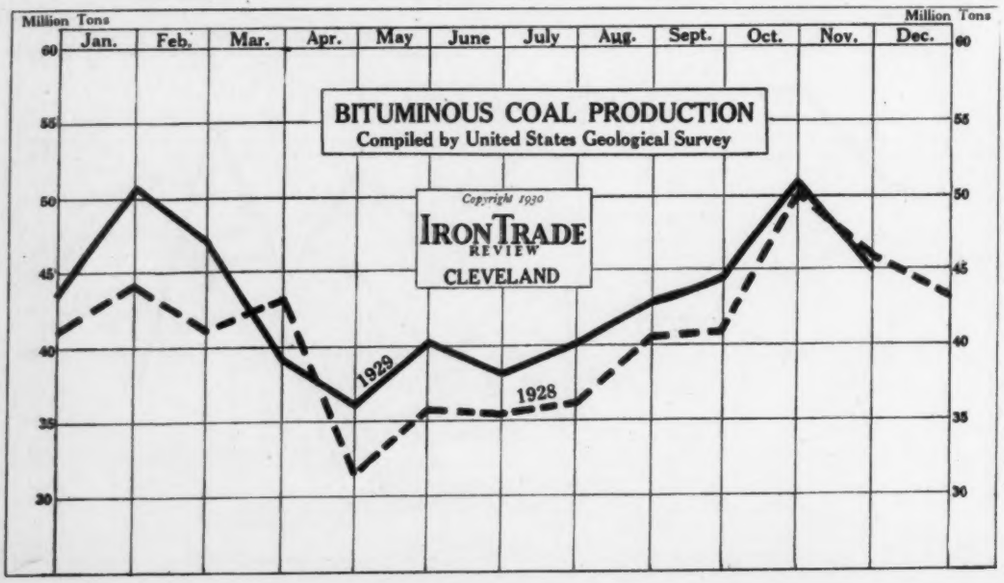
DURING the first 11 months of 1929 exports of iron and steel were 2,817,110 tons, compared with 2,639,876 tons in the corresponding period of 1928. Imports over the first 11 months were 731,433 tons, compared with 712,590 tons in 1928. In November, the last month for which figures are available, imports and exports showed a moderate decline, but held the lead over 1928.

Railroad Freight Car Orders Reach Highest Level in Five Years

THE railroads purchased more new freight cars in 1929 than in any year since 1924. For the first eleven months orders were placed for 96,395 cars compared with 44,000 cars in all of 1928 and 63,295 in all of 1927. The largest month was in October, when orders for 19,506 cars were placed, November orders declining to 6361 cars, but this was a record November.



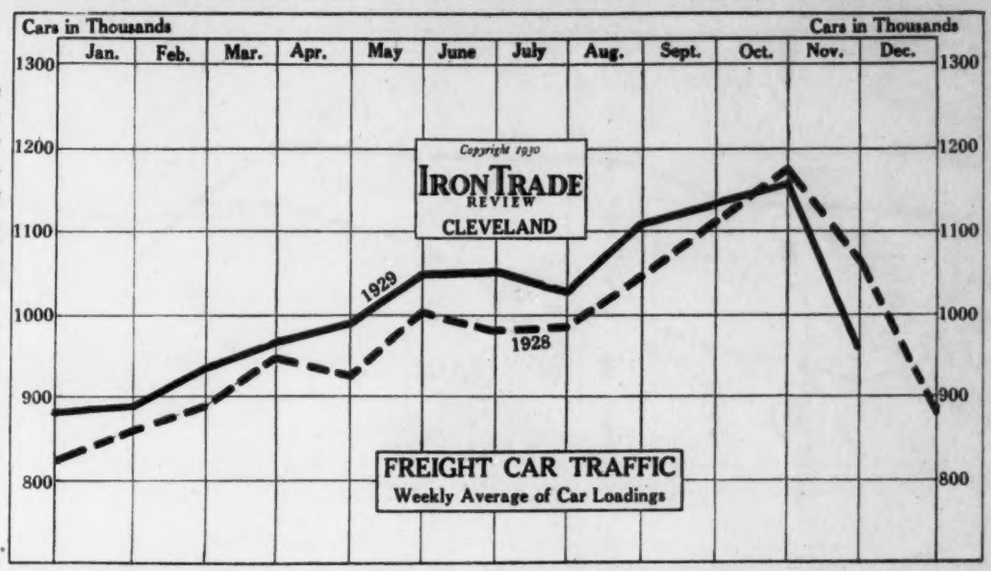
Bituminous Coal Output Generally Higher in 1929 Than in 1928



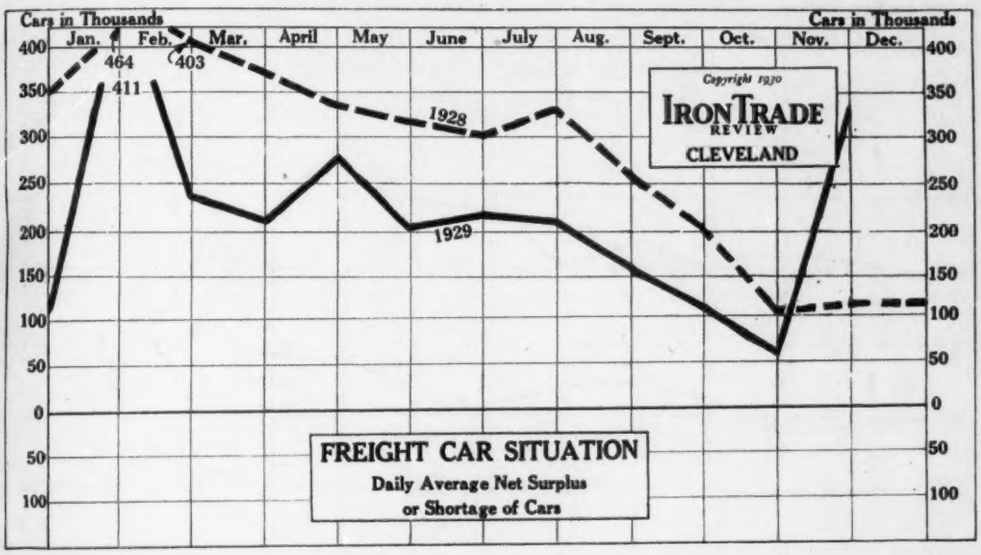
TOTAL production of soft coal for the calendar year to Dec. 7 amounted to 490,835,000 net tons. This compared with 460,546,000 tons in the corresponding period in 1928 and 485,842,000 tons in the corresponding period of 1927. November production of coal was estimated at 45,500,000 tons, compared with 46,788,000 tons in November, 1928. Good 1929 output reflected trade activity.

Freight Car Loadings in 1929 Lead Previous Year Until Near Close

FREIGHT car traffic for 1929 exceeded that of 1928 by over 2 per cent. Until October, loadings were consistently ahead of those for the corresponding period of 1928, but beginning with that month they have declined below 1928, reflecting industrial recessions. To Dec. 7 loadings for the year totaled 50,385,621 compared with 49,057,725 in the corresponding period of the year before.



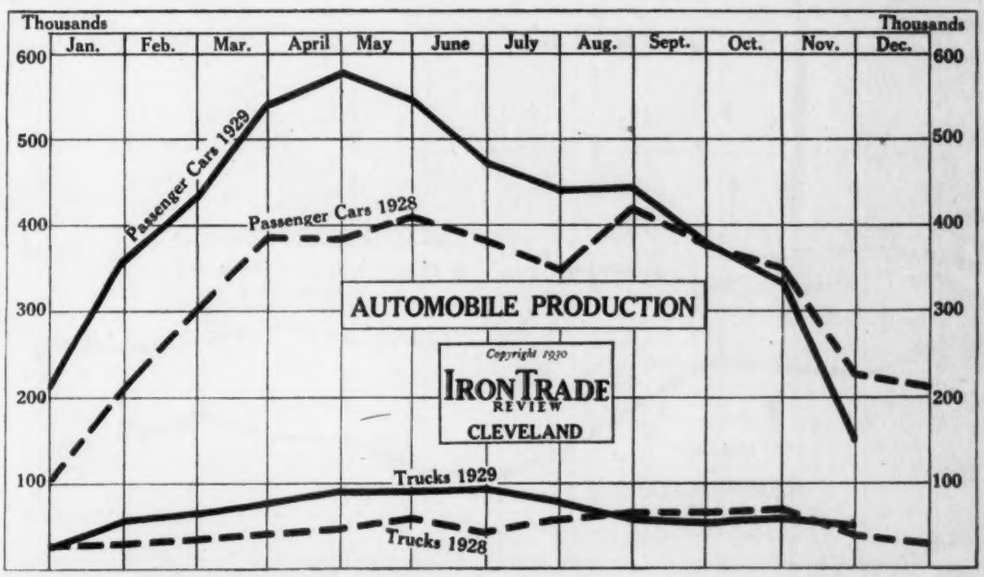
Railroad Efficiency Averts Freight Car Shortage During 1929



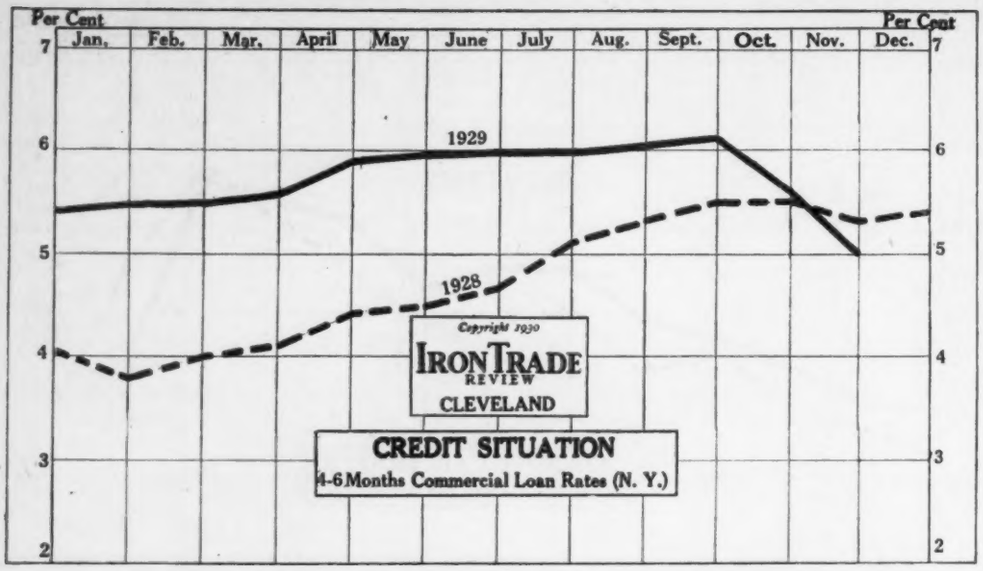
BECAUSE of the larger volume of freight car loading in 1929, the surplus of freight cars available to shippers was steadily below that of one year ago during the first nine months of the year. The lowest point was reached in September, when idle cars totaled 52,000. After the autumn peak of traffic and the letdown in industry, the total climbed above that of last year.

Automobile Production Again Climbs To New High Mark For All Time

PRODUCTION of automobiles in 1929 is estimated at more than 5,600,000 cars and trucks in the United States and Canada. This compares with 4,600,000 units produced in 1928. The peak of production was reached in April and the decline became sharp in October, November and December. Despite this decline the year was a new record for any year in history.



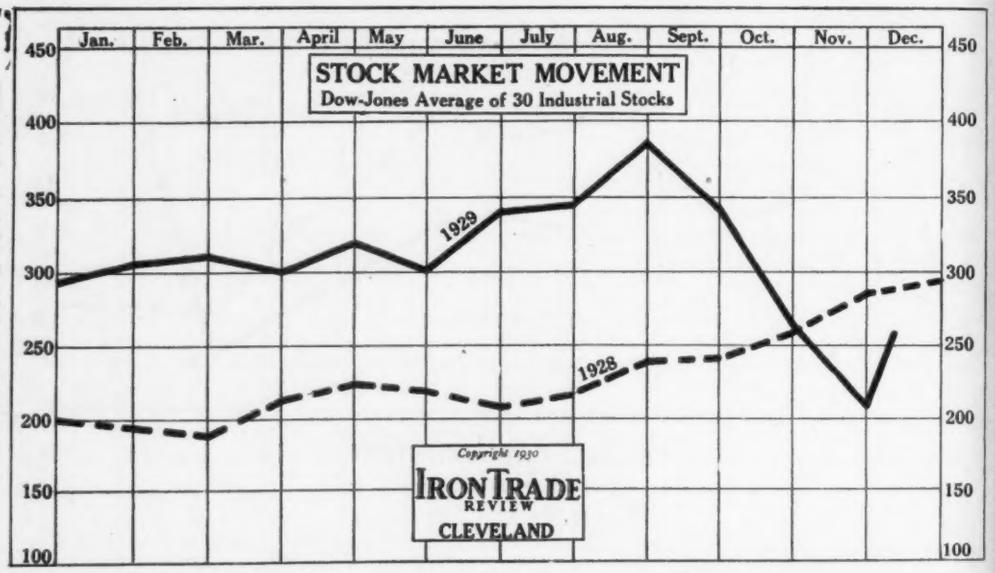
Interest Rates Develop Ease Late in 1929 After Stocks Decline



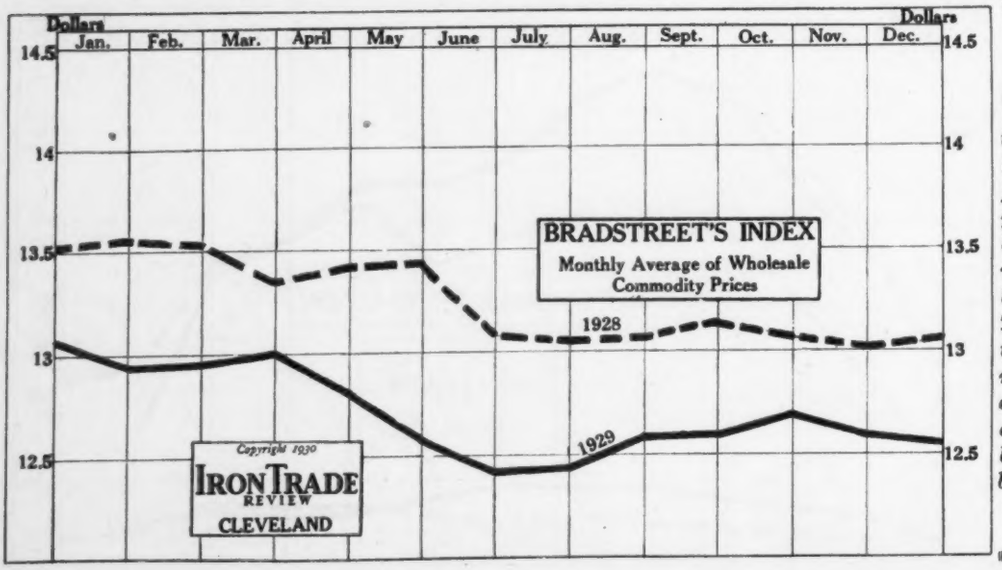
ONE of the distinctive features of the first nine months of 1929 was the firmness of money rates. This was most pronounced for call loans on the New York stock exchange but it was also reflected in commercial credit, which advanced to over 6 per cent. The decline in security prices brought ease in money rates and commercial loans declined to 5 per cent before 1929 ended.

Security Prices Suffer Unprecedented Decline After Great Peak

THE New York stock market witnessed the most severe decline in history during October and November. In September the Dow-Jones average of 30 industrial stocks climbed to a peak of 383. The recession over the next two months amounted to 185 points, bringing the average to an extreme low of 198. Before the middle of December the averages had recovered to over 250.



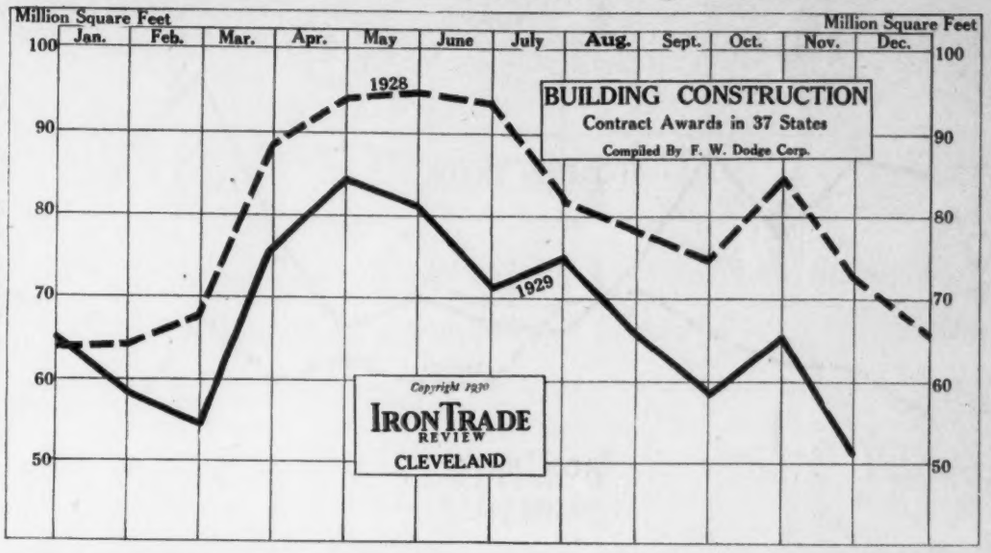
Wholesale Commodity Prices Reveal Nothing Resembling Inflation



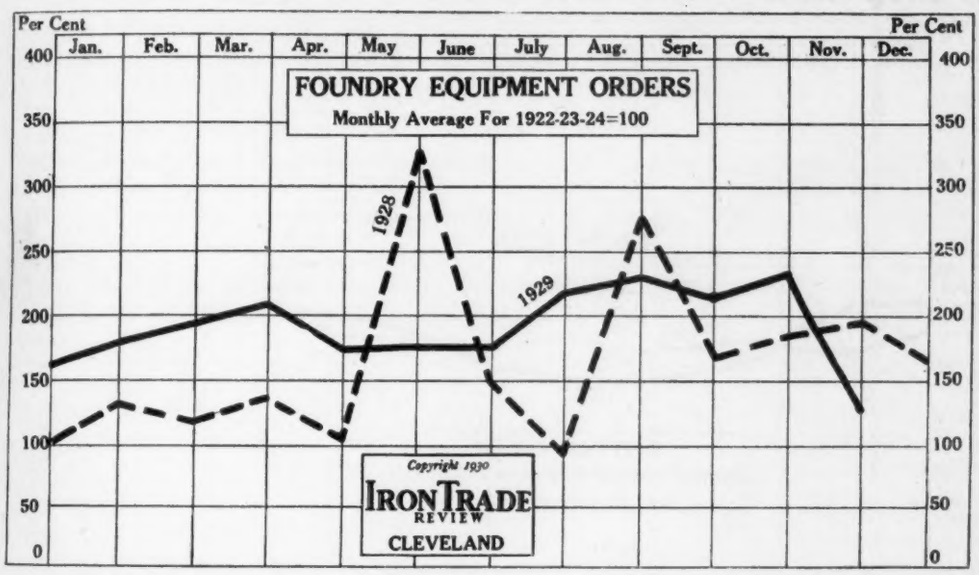
ONE of the most encouraging factors in the business structure has been the lack of price inflation during the past year. This is indicated by Bradstreet's index, which has held steadily below the level of 1928. The last two months of the year brought further recession and the index at the beginning of December was 7 per cent below that of 12 months before.

Building Construction Falls to Lower Level During Past Year

BUILDING construction as reported by the F. W. Dodge Corp. declined about 16 per cent from the high record of 1928. Contract awards for 11 months amounted to 757,888,000 square feet, compared with 901,025,000 square feet in the corresponding period of 1928 and 787,200,000 square feet in the corresponding period of 1927. High interest rates caused some recession.



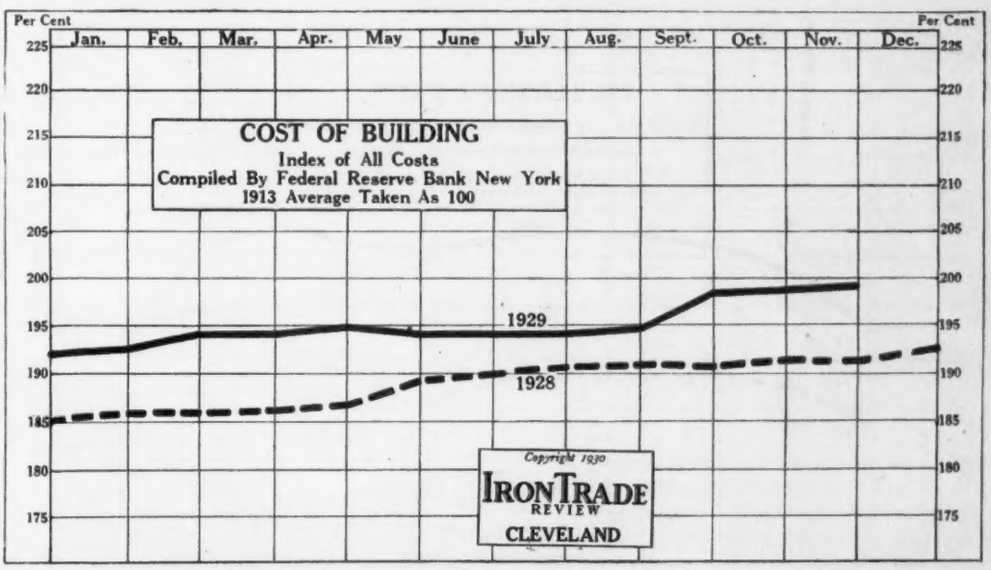
Foundry Equipment Orders Make Good Showing Over Last 12 Months



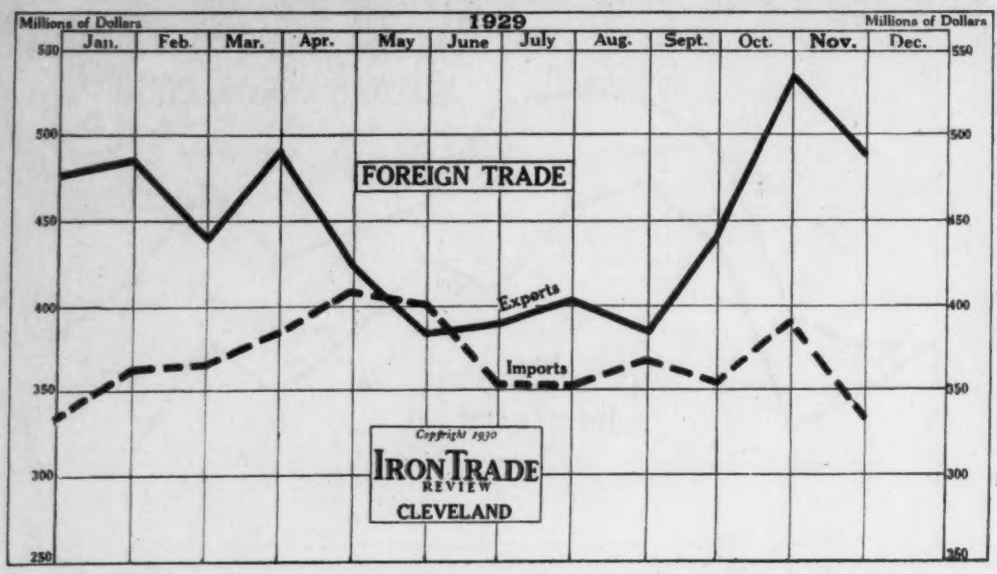
DEMAND for foundry equipment was relatively high throughout nearly all of 1929. The level of orders, as revealed by the accompanying chart, was more stable than in the preceding year until November. In that month a sharp contraction of demand took place, bringing them down to 128 per cent, compared with 245 in October and 199 one year before.

Building Costs in 1929 Hold to Level Well Above Preceding Year

NOTWITHSTANDING the decline in building construction during 1929, the cost of building throughout the year was higher than in 1928. The closing month brought further increases and in November building costs were nearly 200 per cent of the 1913 average. Material prices have shown some advance over one year ago, but the chief cause of the increase was increased wages.


Per Cent
Per Cent
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
225 220 215 210 205 200 195 190 185 180 175
COST OF BUILDING
Index of All Costs
Compiled By Federal Reserve Bank New York
1913 Average Taken As 100
1929
1928
Copyright 1930
IRON TRADE REVIEW
CLEVELAND

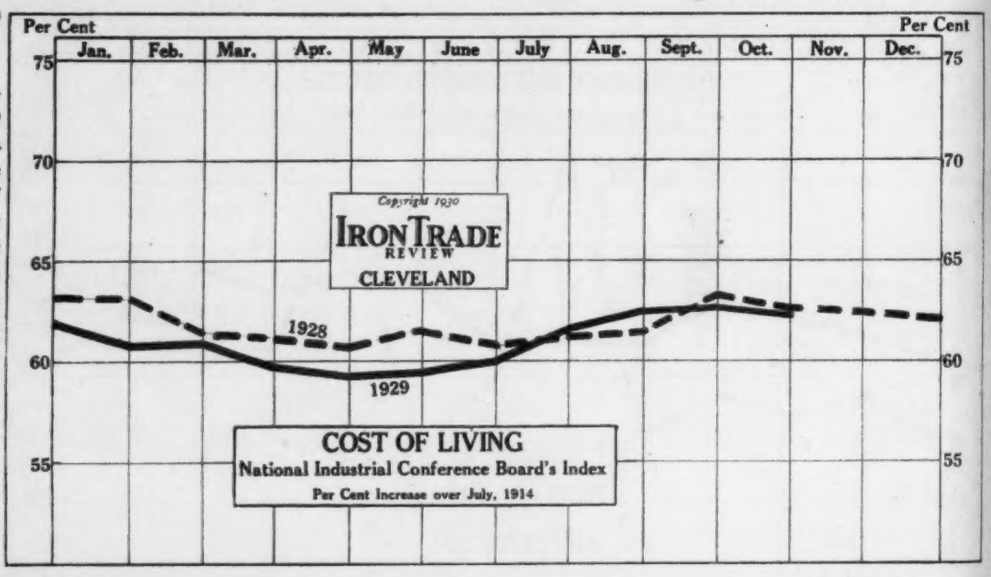
American Foreign Trade Maintains Favorable Stride During 1929



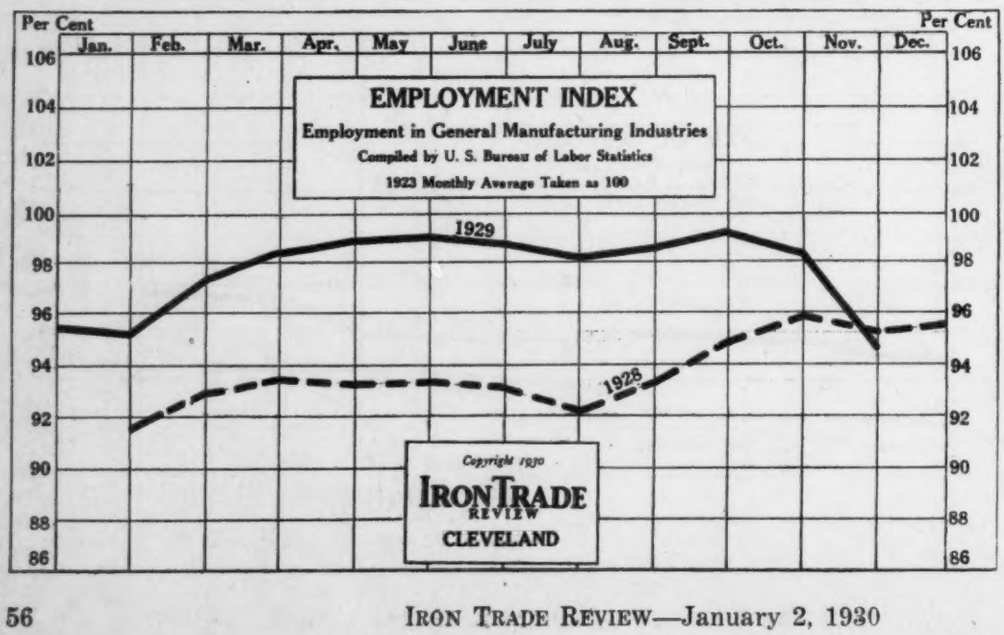
EXPORTS of American merchandise of the United States in the first 11 months of 1929 totaled $4,820,411,000. This compares with $4,655,459,000 in the like period of 1928. Imports were $4,090,043,000, compared with $3,752,451,000 in the like period of 1928. The excess of exports over imports of $730,000,000 compared with an excess of $903,800,000 for 1928.

Living Costs Show Little Variance From 1928 During Past Year

GENERAL level of living costs in 1929 showed little change from the preceding year. The index during the first half of the year was generally lower than in the first half of 1928, but in July it went slightly above one year ago. The average has been between 60 and 64 per cent over the 1914 level. The most important recession in the last year or two has been in the factor of rents.



Industrial Employment Holds To High Level During Most of 1929



EMPLOYMENT in general manufacturing industries, according to the index of the United States bureau of labor statistics, held at a high level during 1929. The peak was reached in September, when the level of employment was over 98 per cent of the monthly average of 1923. This compared with 95 per cent in September, 1928. November and December witnessed some recession.

Steel Industry Speeds and Enlarges Its Expansion Program

New Construction of Open Hearths and Rolling Mills Increases Sharply in 1929—Modernizing of Blast Furnaces Continues

SPURRED by an extended run of extraordinary prosperity, by keen competition and by the ever present necessity of defeating obsolescence, the American steel industry in 1929 took steps to speed and broaden its already comprehensive program of expansion. This accelerated activity is reflected in new construction and rehabilitation in practically every branch of the industry, but it is particularly noticeable in the building of new steelworks and rolling mill capacity and in the modernization of blast furnaces.

The marked degree with which new capacity was added in 1929 is indicated by the following comparisons covering a period of 13 years:

Year	By-Product Ovens	Blast Furnaces	Open Hearths	Rolling Mills
1917	....	....	101	....
1918	....	....	39	....
1919	783	2	23	50
1920	1213	6	26	241
1921	283	1	13	185
1922	133	....	7	46
1923	48	1	8	171
1924	684	1	16	67
1925	299	1	9	93
1926	733	5	18	113
1927	925	....	10	57
1928	445	2	13	53
1929	310	....	14	97

Increased activity is even more apparent in the construction under way but not completed at the end of 1929. The work in progress is as follows:

Work in Progress, Dec. 31, 1929

	Number
Open-hearths building	42
Blast furnaces being remodeled	8
By-product ovens building	546
Rolling mills building	104

Steelworks expansion during 1929 included 14 basic open-hearth furnaces. Increased ingot capacity afforded by the new melting units amounts to 1,134,700 tons. Ingot capacity added in 1928 as a result of the completion of 13 basic open-hearth was estimated at 1,204,500 tons.

Basic open-hearth furnaces under construction at the beginning of 1929 totaled 42 and promised 3,711,300 tons annually to the steelmaking capacity.

No new blast furnaces were built in 1929, but, as indicated in Table IV, 17 stacks were remodeled. In many cases the stacks were replaced entirely. Three of the stacks were redesigned to produce 1000 tons of hot metal daily. These are the No. 3 stack of the International Harvester Co., Chicago; the No. 4 stack of the Jones & Laughlin Steel Corp., Aliquippa, Pa., and the No. 2 stack of the Weirton Steel Co., Weirton, W. Va. Many of the stacks being remodeled will be blown in this year and daily casts are expected to exceed 1000 tons.

Stacks dismantled last year, or being dismantled as this year opened totaled 19. This compares with 18 in 1928, 15 in 1927, 16 in 1926, 27 in 1925, 7 in 1924 and 4 in 1923. Blast furnaces dismantled or abandoned in 1929 are as follows:

BLAST FURNACES DISMANTLED DURING 1929

Name of Owner	Name of Stack
Bethlehem Steel Co., Coatesville, Pa.	B
Byers Co., A. M., Girard, O.	Mattie
Carnegie Steel Co., Bellaire, O.	Nos. 1 and 2
Goshen Furnace Co., Goshen, Va.	Victoria
Graham Furnace Corp., Bluefield, Va.	Graham
Illinois Steel Co., Milwaukee	Nos. 1 and 2
Intermont Coal & Iron Corp., Big Stone Gap, Va.	Big Stone Gap
Milwaukee Blast Furnace Co., Milwaukee	Milwaukee
Napier Iron Works, Napier, Tenn.	Napier
Southern States Iron & Coal Corp., Chattanooga, Tenn.	Chattanooga
Tennessee Coal, Iron & Railroad Co., Bessemer, Ala.	Nos. 1 and 2
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.	Alice
Texas Steel Co., Rusk, Tex.	Sam Lanham
Wellston Iron Furnace Co., Jackson, O.	Nos. 1 and 2
Wheeling Steel Corp., Wheeling, W. Va.	Top
Total	19

Table I

Recapitulation

	Completed 1929	Building 1930
By-Product coke ovens	310	546
Open-hearth furnaces	14	42
Rolling Mills:		
Bar	3	2
Billet	3	1
Billet-sheet bar	0	2
Blooming	1	5
Edging	2	1
Flattening	1	0
Hoop	2	0
Merchant	6	5
Plate, 4-high	1	0
Rod	1	0
Roughing	5	0
Seamless	0	2
Sheet, 2-high cold	18	30
Sheet, 4-high cold	0	1
Sheet, 2-high hot	10	33
Skelp, 2-high	0	2
Skelp, 4-high	1	0
Strip, 2-high cold	14	8
Strip, 4-high cold	6	5
Strip, 2-high hot	4	2
Strip, 4-high hot	4	1
Structural	0	1
Tin, cold	5	0
Tin, hot	8	0
Tube expanding	1	0
Tube forming	1	0
Universal	0	3
Total rolling mills	97	104

As shown in Table VI, new by-product coke ovens built during 1929 totaled 310, with a combined output of 1,954,500 tons of coke. Ovens completed by iron and steel producers totaled 200 or 64 per cent of the new units; ovens completed by public utility companies totaled 110 or 36 per cent. About 1,322,000 or 67 per cent of the by-product coke capacity completed in 1929 will be consumed by blast furnaces while 632,500 tons or 33 per cent will be produced by the new by-product gas plants. At the beginning of 1930 as shown in Table VII, regenerative ovens under construction totaled 546.

These new ovens will afford an addition to the national output of by-product coke of 3,599,300 tons. Two additional batteries of ovens are projected, one by the Colorado Fuel & Iron Co., Pueblo, Colo., and one by the Weirton Steel Co., Weirton, W. Va. Approximately 74 per cent of the ovens now under construction are being built by iron and steel companies and approximately 26 per cent by public service companies and by companies desiring the output of gas rather than of coke.

Rolling mills completed during 1929 totaled 97. In addition six mills representing replacements also were com-

pleted. The total number of mills completed at the close of the year is made up largely of hot and cold sheet, strip, tin and merchant mills. Twelve of the new units listed in Table VIII are of 4-high construction.

Various types of rolling mills under construction totaled 104. Of this total five are blooming, five merchant, 33 hot sheet, 30 cold sheet and eight strip mills. Seven of the units being built are of 4-high construction. Newly established companies entering the rolling industry for the first time include Bopp Steel Corp., Detroit with strip capacity; Canton Rolling Mill Corp., Canton, O. with sheet capacity; Great Lakes Steel Corp., Ecorse, Mich., with strip capacity; and the Tarentum Steel Co., Tarentum, Pa., with full-finished auto sheet capacity.

New soaking pit installations completed of building include a 1-way-fired battery at the Riverside works of the Otis Steel Co., Cleveland; one battery at the Upson division of the Bourne-Fuller Co., Cleveland; a 7-hole installation at Corrigan, McKinney Steel Co., Cleveland, a 4-hole regenerative unit at the Butler, Pa., plant of American Rolling Mill Co.; 24 modern pits to replace nine at the Johnstown, Pa., plant of Bethlehem Steel Co.; two 4-hole pits at the Indiana Harbor, Ind., division of Youngstown Sheet & Tube Co.; and eight pits at the Sparrows Point plant of Bethlehem Steel Co.

Two sintering plants were completed last year, one being installed at the Indiana Harbor plant of the Youngstown Sheet & Tube Co., and one 150-ton unit by the Hamilton Coke & Iron Co., Hamilton, O. The A. M. Byers Co. has two 10-ton bessemer converters in the course of construction at Ambridge, Pa., to be used in conjunction with its new wrought iron process. The Heppenstall Co., Pittsburgh, increased two acid open hearths from 18 to 25 tons each. A new chain fence department was placed in initial operation by the Continental Steel Corp., Kokomo, Ind. A new pig machine was installed by the Jackson Iron & Steel Co., Jackson, O. Extensive improvements are being effected to the bessemer department at the South Side works of the Jones & Laughlin Steel Corp., Pittsburgh, and

Equipment Completed or Building During 1929

Table II

Open Hearths Completed in 1929

Company	Number of furnaces	Rated capacity tons	Annual capacity tons
Continental Steel Corp., Kokomo, Ind.	1	100	70,000
Empire Steel Corp., Mansfield, O.	2	85	120,000
Ford Motor Co., Fordson, Mich	3	100	210,000
Inland Steel Co., Indiana Harbor, Ind.	1	150	85,700
Interstate Iron & Steel Co., S. Chicago, Ill.	1	100	70,000
Laclede Steel Co., Alton, Ill.	1	100	70,000
Sheffield Steel Corp., Kansas City, Mo.	1	100	70,000
Tulsa Rolling Mills Co., Sands Springs, Okla.	1	100	70,000
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	3	250	369,000
Total	14		1,134,700

Table III

Open Hearths Building Dec. 31

Company	Number of furnaces	Rated Capacity Tons	Annual Capacity Tons
Bethlehem Steel Co., Lackawanna, N. Y.	6	150	514,200
Bethlehem Steel Co., Sparrows Point, Md.	6	150	514,200
Great Lakes Steel Corp., Detroit	6	150	514,200
Illinois Steel Co., Gary, Ind.	7	150	599,900
Illinois Steel Co., S. Chicago, Ill.	14	150	1,199,800
National Tube Co., McKeesport, Pa.	3	250	369,000
Total	42		3,711,300

Table IV

Stacks Remodeled During 1929

Company	Number or name
American Rolling Mill Co., Ashland, Ky.	"Norton"
Bethlehem Steel Co., Sparrows Point, Md.	"B"
By-Products Coke Corp., S. Chicago, Ill.	"B"
Carnegie Steel Co., Braddock, Pa.	"I"
Carnegie Steel Co., Clairton, Pa.	No. 1
Carnegie Steel Co., Clairton, Pa.	No. 2
Carnegie Steel Co., Youngstown, O.	No. 2
Davison Coke & Iron Co., Pittsburgh	Neville Island
Illinois Steel Co., Gary, Ind.	Nos. 10 and 11
Illinois Steel Co., S. Chicago, Ill.	No. 8
International Harvester Co., S. Chicago, Ill.	No. 3
Jones & Laughlin Steel Corp., Aliquippa, Pa.	No. 4
National Tube Co., Lorain, O.	No. 1
Weirton Steel Co., Weirton, W. Va.	No. 2
Wheeling Steel Corp., Steubenville, O.	No. 1
Youngstown Sheet & Tube Co., Campbell, O.	"A"
Total	17

Table V

Stacks Being Remodeled Dec. 31

Company	Number or name
Bethlehem Steel Co., Johnstown, Pa.	"G"
Bethlehem Steel Co., Sparrows Point, Md.	"C"
Carnegie Steel Co., Braddock, Pa.	"D"
Illinois Steel Co., Gary, Ind.	No. 10
Illinois Steel Co., S. Chicago, Ill.	No. 5
Otis Steel Co., Cleveland	No. 2
Weirton Steel Co., Weirton, W. Va.	No. 1
Youngstown Sheet & Tube Co., Campbell, O.	"C"
Total	8

Table VI

By-Product Ovens Completed, 1929

Company	No. of ovens	Type of ovens	Est. annual coking capacity tons
Central Alloy Steel Corp., Canton, O.	15	K-B	94,200
Central Public Service Corp., Rockford, Ill.	21	K-B	73,500
Davison Coke & Iron Co., Pittsburgh	70	K-B	518,000
Inland Steel Co., Indiana Harbor, Ind.	74	K-B	464,800
Philadelphia Coke Co., Philadelphia	74	K-B	464,800
Rainey Wood Coke Co., Swedeland, Pa.	41	K-B	245,000
Wisconsin Public Service Corp., Sheboygan, Wis.	15	K-B	94,200
Total	310		1,954,500

Table VII

Ovens Building Dec. 31, 1929

Company	No. of ovens	Type of ovens	Est. annual coking capacity tons
Bethlehem Steel Co., Johnstown, Pa.	77	K-B	485,100
Bethlehem Steel Co., Sparrows Point, Md.	61	K-B	384,300
Colorado Fuel & Iron Co., Pueblo, Colo.	†42		
Illinois Steel Co., Gary, Ind.	138	K-B	1,021,200
Jones & Laughlin Steel Corp., Aliquippa	81	K-B	510,300
New England Fuel & Transportation Co., Everett, Mass.	82	K-B	516,600
Providence Gas Co., Providence, R. I.	25	K-B	157,500
Rochester Gas & Electric Corp., N. Y.	37	K-B	233,100
Weirton Steel Co., Weirton, W. Va.	†1 battery		
Wisconsin Steel Co., S. Chicago, Ill.	45	K-B	291,200
Total	546		3,599,300

†Projected

at the North Side works by the installation of a 12,000-horsepower gas-fired boiler plant with auxiliary equipment and the installation of a 20,000-kilowatt turbo generator.

The Great Lakes Steel Corp., Detroit, now a unit of the National Steel Corp., is expected to have its new steel plant ready for operation in April. The open-hearth department will include six 150-ton furnaces. The mill equipment consists of a 40-inch blooming, a 10-stand billet-sheet bar and a 4-high 11-stand continuous hot strip mill with a capacity for rolling material up to 30 inches wide. Additional finishing capacity has not been determined. The plant will have a capacity of 35,000 to 40,000 tons of finished steel a month.

Proposed construction of the Republic Steel Co. includes new equipment and changes to permit operating the open-hearth furnaces on larger heats and the remodeling of the mixer plant at Youngstown, O. The Allegheny Steel Co., Brackenridge, Pa., in 1929 installed four additional electric melting furnaces, making a total of nine. Appropriations have been made for 1930 covering additional electric melting furnaces, electric heating and annealing equipment and the installation of a Steckel-type 4-high cold mill.

The Ludlum Steel Co., Watervliet, N. Y., completed a new plant for the manufacture of Strauss metal, a new heat treating department with furnace, a heating furnace for its 9-inch merchant mill and an experimental electric furnace of ¾-ton capacity. The Central Iron & Steel Co., Harrisburg, Pa., installed nine 250-horsepower waste-heat boilers at the plate mill heating furnaces, a 54-inch coal pulverizing mill and a 300-ton hydraulic press in the flanging department.

A wire, nail and fence department was added by the Sheffield Steel Corp., Kansas City, Mo. Follansbee Brothers Co., Follansbee, W. Va., brought to completion the electrification of its hot and cold sheet mills.

Deutsche Maschinenbaugesellschaft, known as the Demag, is reported to have obtained an order for four 120-ton open-hearth furnaces from the South Manchuria Railroad Co. for its plant at Anzan. A previous order had been received for six 100-ton open-hearth furnaces.

Rolling Mills Completed or Building During 1929

Table VIII

Rolling Mills Completed During 1929

Company	No. Mills	Type Mills
Acme Steel Co., Riverdale, Ill.	1	10" hot strip
Acme Steel Co., Riverdale, Ill.	5	12" roughing
Acme Steel Co., Riverdale, Ill.	1	4-high cold strip
American Rolling Mill Co., Butler, Pa.	3	48" 4-high hot strip
American Rolling Mill Co., Butler, Pa.	13	26" cold sheet
American Rolling Mill Co., Middletown, O.	1	hot strip
American Sheet & Tin Plate Co., Farrell, Pa.	1	84" 4-high plate
American Steel & Wire Co., Cleveland	1	hot strip
American Tube & Stamping Co., Bridgeport Conn.	2	12" merchant
Apollo Steel Co., Apollo, Pa.	*3	26" cold sheet
Atlantic Steel Co., Atlanta, Ga.	1	14" edging
Blair Strip Steel Co., New Castle, Pa.	1	16" cold strip
Carnegie Steel Co., McDonald, O.	1	10" hoop
Carpenter Steel Co., Reading, Pa.	1	12" cold strip
Carpenter Steel Co., Reading, Pa.	2	8" cold strip
Carpenter Steel Co., Reading, Pa.	2	6" cold strip
Chrome Steel Corp., Carteret, N. J.	1	12" merchant
Columbia Steel Corp., Pittsburg, Calif.	1	jobbing sheet
Columbia Steel Corp., Pittsburg, Calif.	1	merchant
Columbia Steel Corp., Pittsburg, Calif.	1	24" billet
Columbia Steel Corp., Pittsburg, Calif.	5	28" cold tin
Columbia Steel Corp., Pittsburg, Calif.	8	28" hot tin
Continental Steel Corp., Kokomo, Ind.	6	29" hot sheet
Continental Steel Corp., Kokomo, Ind.	2	26" cold sheet
Continental Steel Corp., Kokomo, Ind.	*1	20" rod
Crosby, J. D. Co., Pawtucket, R. I.	1	12" 4-high cold strip
Dilworth, Porter & Co., Inc., Pittsburgh	1	flattening
Firth Sterling Steel Co., McKeesport, Pa.	1	10" cold strip
Follansbee Bros. Co., Toronto, O.	1	30" hot sheet
Illinois Steel Co., Gary, Ind.	1	tube expanding
Latrobe Electric Steel Co., Latrobe, Pa.	1	12" bar
National Tube Co., McKeesport, Pa.	1	4-high skelp
Otis Steel Co., Cleveland	3	26" cold sheet
Republic Iron & Steel Co., Warren, O.	1	20" cold strip
Republic Iron & Steel Co., Youngstown, O.	1	edging
Republic Iron & Steel Co., Youngstown, O.	1	tube forming
Roebling's, John A., Sons Co., Roebling, N. J.	1	18" billet
Roebling's, John A., Sons Co., Roebling, N. J.	1	9" rod
Seneca Iron & Steel Co., Buffalo, N. Y.	2	29" hot sheet
Sharon Steel Hoop Co., Sharon, Pa.	1	14" hot strip
Sheffield Steel Corp., Kansas City, Mo.	1	24" bar
Sheffield Steel Corp., Kansas City, Mo.	1	18" blooming
Sheffield Steel Corp., Kansas City, Mo.	1	10" merchant
Steel & Tubes, Inc., Elyria, O.	3	12" cold strip
Superior Steel Co., Carnegie, Pa.	3	18" 4-high cold strip
Tennessee Coal, Iron & Railroad Co., Fairfield, Ala.	1	12" hoop
Tulsa Rolling Mills Co., Sand Springs, Okla.	1	24" billet
Tulsa Rolling Mills Co., Sand Springs, Okla.	1	10" bar
Universal Steel Co., Bridgeville, Pa.	1	10" merchant
Wallace-Barnes Co., Bristol, Conn.	1	12" 4-high cold strip
Weirton Steel Co., Weirton, W. Va.	1	20" cold strip
West Leechburg Steel Co., Leechburg, Pa.	2	18" cold strip
West Virginia Rail Co., Huntington, W. Va.	*1	12" slitting
West Virginia Rail Co., Huntington, W. Va.	*1	16" slitting
Wheeling Steel Corp., Steubenville, O.	1	16" 4-high hot strip
Total	97	

*Replacement; not included in total.

Table IX

Rolling Mills Building Dec. 31, 1929

Company	No. mills	Type mills
Acme Steel Co., Riverdale, Ill.	4	16" 4-high cold strip
Allegheny Steel Co., Brackenridge, Pa.	1	4-high cold sheet
Bethlehem Steel Co., Lackawanna, N. Y.	1	billet-sheet bar
Bethlehem Steel Co., Sparrows Point, Md.	1	40" universal
Bethlehem Steel Co., Sparrows Point, Md.	4	30" hot sheet
Bopp Steel Corp., Detroit	1	18" 4-high cold strip
Bopp Steel Corp., Detroit	2	12" cold strip
Byers, A. M. Co., Economy, Pa.	1	40" blooming
Byers, A. M. Co., Economy, Pa.	1	46" universal
Byers, A. M. Co., Economy, Pa.	1	20" skelp
Byers, A. M. Co., Economy, Pa.	1	16" skelp
Canton Rolling Mill Corp., Canton, O.	4	28" hot sheet
Canton Rolling Mill Corp., Canton, O.	8	26" cold sheet
Carnegie Steel Co., McDonald, O.	1	10" bar
Corrigan McKinney Steel Co., Cleveland	1	36" blooming
Great Lakes Steel Corp., Ecorse, Mich.	1	40" blooming
Great Lakes Steel Corp., Ecorse, Mich.	1	21" billet-sheet bar
Great Lakes Steel Corp., Ecorse, Mich.	1	4-high hot strip
Great Lakes Steel Corp., Ecorse, Mich.	.	cold strip
Gulf States Steel Co., Alabama City, Ala.	1	40" blooming
Gulf States Steel Co., Alabama City, Ala.	1	32" universal
Gulf States Steel Co., Alabama City, Ala.	†6	29" hot sheet
Gulf States Steel Co., Alabama City, Ala.	†3	26" cold sheet
Illinois Steel Co., Gary, Ind.	1	28" hot strip
Illinois Steel Co., Gary, Ind.	**1	blooming
Illinois Steel Co., S. Chicago, Ill.	**2	plate
Illinois Steel Co., S. Chicago, Ill.	**1	bar
Illinois Steel Co., S. Chicago, Ill.	1	54" blooming
Illinois Steel Co., S. Chicago, Ill.	1	52" structural
Inland Steel Co., Indiana Harbor, Ind.	1	14" merchant
Inland Steel Co., Indiana Harbor, Ind.	1	12" merchant
Inland Steel Co., Indiana Harbor, Ind.	1	10" merchant
National Tube Co., Lorain, O.	***1	seamless
National Tube Co., McKeesport, Pa.	2	seamless
National Tube Co., McKeesport, Pa.	1	32" bar
Newton Steel Co., Monroe, Mich.	18	26" cold sheet
Newton Steel Co., Monroe, Mich.	20	30" hot sheet
Republic Iron & Steel Co., Youngstown, O.	1	edging
Stanley Works, Bridgeport, Conn.	1	12" hot strip
Tarentum Steel Co., Tarentum, Pa.	5	28" hot sheet
Tarentum Steel Co., Tarentum, Pa.	4	26" cold sheet
Weirton Steel Co., Weirton, W. Va.	†1	structural
West Leechburg Steel Co., Leechburg, Pa.	*1	12" hot strip
Wheeling Steel Corp., Steubenville, O.	6	48" cold strip
Youngstown Sheet and Tube Co., Indiana Harbor, Ind.	1	cont. billet
Youngstown Sheet and Tube Co., Indiana Harbor, Ind.	1	10" merchant
Youngstown Sheet and Tube Co., Indiana Harbor, Ind.	1	14" merchant
Total	104	

*Replacement; not included in total.
**Authorized; not included in total.
***Replaces No. 6 lapweld mill.
†Projected.

Autos, Cars Brighten 1930 Entry

Better First Than Last Quarter Assured—Almost 19,000 Freight Cars on Inquiry—Automobile Specifications Higher—Prices Untested

ONLY once since the war—in troublous 1921—has production of iron and steel in the first quarter of a year failed to better that of the preceding fourth quarter, and the industry enters 1930 confident of maintaining tradition.

The usual heavy backlog of railroad track material, current inquiry for nearly 19,000 freight cars and a carryover of part of 1929's exceptional orders, and moderately expanding automotive requirements are harbingers of improvement.

Order Mail in Valleys Grows Heavier

Producers, on the average, expect shortly to be operating better than at the low point of December, and while not anticipating they will equal last January look for progressive improvement. Buffalo mills have averaged 40 per cent the past week, and Pittsburgh and Chicago 50 to 55. Mahoning valley makers, especially of hot strip and blue and autobody sheets, have received heavier order mail and the valleys average 60 per cent. Two Chicago stacks have been blown out.

Chesapeake & Ohio, Pere Marquette and Hocking Valley are out for 10,625 freight and 91 passenger cars and 130 locomotives, with the other Van Sweringen lines—Nickel Plate and Erie—yet to inquire. Southern Pacific has bought 39 locomotives, Chicago Great Western 15 and Seaboard Air Line 8. Chicago mills have booked 45,000 tons of rails, chiefly from the Burlington, with 70,000 tons pending. From 10,000 to 12,000 tons of track fastenings is on inquiry at Chicago.

Sheets and Nails Soft; Scrap Strong

Sheet prices are somewhat unsteady, with galvanized no higher than 3.40c, Pittsburgh, and blue annealed and autobody being shaded. Nail quotations are unstable in some districts. Pig iron prices remain untested. Scrap is stronger.

A decline of 1 cent lowers the IRON TRADE REVIEW composite to $35.88, compared with an average of $35.95 for December and $36.25 a year ago.

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Jan. 1, 1930	Dec., 1929	Oct., 1929	Jan., 1929
PIG IRON				
Bessemer, del. Pittsburgh	$20.76	20.76	20.76	19.96
Basic, valley	18.50	18.50	18.50	17.50
Basic, eastern, del. eastern Pa.	19.50	19.75	19.75	20.15
No. 2 foundry, del. Pittsburgh	19.76	19.76	19.76	19.36
No. 2 foundry, Chicago	20.00	20.00	20.00	20.00
*Southern No. 2, Birmingham	14.50	14.25	14.00	16.50
**No. 2X, Virginia furnace	18.25	18.25	19.65	21.25
**No. 2X, Eastern del. Philadelphia	21.76	21.76	22.26	22.26
Malleable, valley	19.00	19.00	19.00	18.00
Malleable, Chicago	20.00	20.00	20.00	20.00
Lake Superior, charcoal, del. Chicago	27.04	27.04	27.04	27.04
†Gray forge, del. Pittsburgh	19.13	19.13	19.13	18.76
Ferromanganese, del. Pittsburgh	104.79	104.79	109.79	109.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon. †Now based on Pitts. dist. fur. price; formerly on Valley base.				
COKE				
Connellsville furnace, ovens	2.60	2.65	2.65	2.75
Connellsville foundry, ovens	3.50	3.50	3.75	3.75
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	34.00	34.00	35.00	34.00
Sheet bars, open-hearth, Pittsburgh	34.00	34.75	35.00	34.00
Billets, open-hearth, Pittsburgh	34.00	34.75	35.00	33.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00

	Jan. 1, 1930	Dec., 1929	Oct., 1929	Jan., 1929
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.90	1.90	1.90	1.90
Steel bars, Chicago	2.00	2.00	2.05	2.00
Steel bars, Philadelphia	2.22	2.22	2.22	2.27
Iron bars, Chicago	2.00	2.00	2.05	2.00
Shapes, Pittsburgh	1.90	1.90	1.95	1.90
Shapes, Philadelphia	1.91	1.91	2.01	2.06
Shapes, Chicago	2.00	2.00	2.05	2.00
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Philadelphia	2.10	2.10	2.15	2.10
Tank plates, Chicago	2.00	2.00	2.05	2.00
Sheets, black, No. 24, Pittsburgh	2.75	2.75	2.80	2.85
*Sheets, blue anl., No. 13, Pittsburgh	2.35	2.35	2.35	2.10
Sheets, gal., No. 24, Pittsburgh	3.40	3.40	3.50	3.60
Sheets, black, No. 24, Chicago	2.90	2.90	3.05	3.00
*Sheets, blue anl., No. 13, Chicago	2.50	2.50	2.50	2.25
Sheets, galvanized, No. 24, Chicago	3.55	3.60	3.70	3.75
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh	2.40	2.40	2.45	2.65
Tin plate, per base box, Pittsburgh	5.35	5.35	5.35	5.35
*Comparison for January, 1929, is with old blue annealed base, No. 10.				
SCRAP				
Heavy melting steel, Pittsburgh	15.75	15.10	17.30	19.00
Heavy melting steel, eastern Pa.	14.50	14.50	15.80	16.50
Heavy melting steel, Chicago	12.50	12.50	14.45	16.50
No. 1 wrought, eastern Pa.	15.25	15.25	16.00	15.50
No. 1 wrought, Chicago	13.20	13.25	14.85	14.75
Rails for rolling, Chicago	14.50	14.60	17.05	17.10

Current Prices for Rolled Steel Products

STEEL PLATES

Pittsburgh, base	1.90c
Philadelphia, del.	2.10c to 2.15c
New York, del.	2.175c to 2.225c
Boston, del.	2.265c to 2.415c
Chicago, base	2.00c
Cleveland, delivered	2.09c
Lackawanna, N. Y., base	2.05c to 2.15c
Birmingham, base	2.05c
Coatesville, Pa., base	2.00c to 2.05c
Pacific Coast, c.i.f.	2.35c
St. Louis, del.	2.22c
Detroit, del.	2.19c

STRUCTURAL SHAPES

Pittsburgh, base	1.90c
Philadelphia, del.	1.91c to 2.01c
New York, del.	2.145c to 2.195c
Boston, del.	2.265c
Chicago, base	2.00c
Cleveland, delivered	2.09c
Lackawanna, N. Y.	2.05c to 2.15c
Birmingham, base	2.05c
Bethlehem, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
Detroit, del.	2.19c

BARS
SOFT STEEL

Pittsburgh, base	1.90c
Chicago, base	2.00c
Birmingham, base	2.05c
Lackawanna, N. Y., base	2.00c to 2.05c
Pacific Coast, c.i.f.	2.35c
Cleveland, base, local mills	1.85c
Cleveland, del., outside mills	1.875c
Philadelphia, del.	2.22c
New York, delivered	2.24c to 2.29c
Boston, delivered	2.265c
Detroit, del.	2.085c to 2.19c
Pittsburgh, cold finishing	2.00c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.90c to 1.95c
Eastern mills	1.85c to 1.95c

IRON

Chicago, base	2.00c to 2.10c
New York, delivered	2.19c to 2.24c
Philadelphia, delivered	2.17c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh, billet, cut lengths	2.20c
Stock lengths from mill	1.95c
Chicago, billet	1.90c to 2.00c
Chicago, rail steel	1.80c to 2.00c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.42c to 2.62c

CORROSION, HEAT RESISTANT ALLOYS
Base, Pittsburgh

18 per cent chrome, 8 per cent nickel

Sheets....35.00c; plates....31.00c; bars....28.00c

	A	B	C	D
Bars	19c	20.5c	22c	25c
Plates	22c	23.5c	25c	28c
Sheets	26c	27.5c	29c	32c
Hot strip	19c	20.5c	22c	25c
Cold strip	28c	29.5c	31c	34c

Carbon 0.12% and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30% inc.

SHEETS
SHEET MILL BLACK, NO. 24

Pittsburgh, base	2.75c
Philadelphia, delivered	2.97c to 3.07c
Gary, Indiana Harbor	2.85c
Chicago, delivered	2.90c
Birmingham base	3.00c
St. Louis, del.	3.07c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.90c to 3.00c
Gary, base	3.00c to 3.10c

GALVANIZED NO. 24

Pittsburgh, base	3.40c
Philadelphia, delivered	3.62c to 3.72c
Gary, Indiana Harbor	3.50c to 3.60c
Chicago delivered	3.55c to 3.65c
Birmingham, base	3.65c
St. Louis, del.	3.82c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.35c
Chicago, district mills	2.45c
Chicago, delivered	2.50c
St. Louis, delivered	2.67c
Philadelphia, delivered	2.67c
Birmingham	2.50c

BLUE ANNEALED PLATES, NO. 9-10

Pittsburgh, base	2.20c
Chicago district mills	2.30c
Chicago, delivered	2.35c
Philadelphia, delivered	2.52c
St. Louis, delivered	2.52c
Birmingham	2.35c

AUTOMOBILE, NO. 20

Pittsburgh, base	4.00c
Detroit, delivered	4.29c

FURNITURE

Pittsburgh	4.00c to 4.10c

(Turn to the following page)

Pig Iron

Shipments Starting Upward After Dull Month—One-tenth of First Quarter Needs Covered—Prices Not Fully Tested

JANUARY shipments of pig iron are likely to show an increase over those of December. Releases are beginning to appear, and the movement to the automotive industry is on the upgrade. A large tonnage due on December orders has been held up temporarily over the inventory season, and while the melt has been reduced in December, consumers have practically no stocks. A large eastern pipemaker has suspended shipments for the present. Contracting for first quarter has been much below expectations. Not more than 10 per cent of the general first quarter requirements have been covered. Two more southern furnaces have been dropped. Prices unchanged.

PIG IRON PRICES, PAGE 63

PITTSBURGH, Dec. 31.—Sentiment among pig iron producers continues good. Consumers have permitted stocks to decline to a low level and considerable tonnage has been held up, awaiting the turn of the year. Prices are steady at $18.50 for No. 2 foundry and basic, and $19 for bessemer and malleable.

New York, Dec. 31.—New pig iron inquiry totals 6000 tons. A Bridgeport, Conn., consumer has closed on 1500 tons, including 1000 tons of malleable. Worthington Pump & Machinery Corp. has closed for 325 tons for Holyoke, Mass., and 450 tons for Cincinnati. This interest is now inquiring for 700 tons for Harrison, N. J. Richmond Radiator Co. is expected in the market within a week for iron for Uniontown, Pa. Prices are generally steady.

Philadelphia, Dec. 31.—Inquiries for pig iron show improvement, but buying for first quarter continues delayed. Pipemakers are consuming less than normal tonnage, and one large interest has held up shipments. Prices are unchanged, though basic appears easier.

Buffalo, Dec. 31.—Buffalo furnace interests are figuring on a portion of General Electric Co.'s inquiry for 4000 tons for various plants. Other inquiries and sales are small. Prices are steady.

Cleveland, Dec. 31.—Cleveland furnace interests booked 14,000 tons in the past week, practically the same as in the week preceding. Shipping demand is better, especially that from the automotive industry. Prices are steady.

Chicago, Dec. 31.—Several additional first quarter contract sales have been negotiated, but estimates are that only about 10 per cent of normal production has been placed under contract for the 3-month period. December shipments were a shade higher than in November. A South Bend, Ind., farm equipment company has purchased several thousand tons for its plants and will buy additional tonnage. Among inquiries are about 1000 tons from western Michigan. The price of $20, base Chicago furnace, is unchanged for current negotiations under way in the immediate Chicago territory.

Cincinnati, Dec. 31.—One lot of 1000 tons of low phosphorus iron, and one lot of 600 tons of southern iron were booked in this district in the past week. Several inquiries, each for less than 1000 tons, are current. Prices are unchanged.

Birmingham, Ala., Dec. 31.—A fair amount of pig iron has been sold for first quarter. Production has been reduced by the blowing out of one furnace and banking another. Prices are unchanged.

Toronto, Ont., Dec. 31.—About half of those melters who place quarterly contracts are covered for the next three months. Business is expected to be as large as that of the last quarter of 1929. Prices are at the same level as at the beginning of the year.

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts.	2.00c
Hot strip 6 1/8 to 24-in., Pitts.	1.90c
Hot strip, bands 6 in. and under, Chicago	2.10c
Do. 6 1/8 to 23 1/8	2.00c
Cooperage stock, Pittsburgh	2.20c
Do, Chicago	2.30c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve. (3 ton and over)	2.75c
Worcester, Mass. (3 tons and over)	2.90c to 3.00c

ALLOY STEEL

Hot Rolled
F.o.b. Mills
Alloy Quality Bar Base is 2.65c

S.A.E. Series Number	Alloy differential	Net 100 lb. bars
2000	0.25	$2.90
2100	0.55	3.20
2300	1.50	4.15
2500	2.25	4.90
3100	0.55	3.20
3200	1.35	4.00
3300	3.80	6.45
3400	3.20	5.85
4100 0.15-0.25 Mo.	0.50	3.15
4100 0.25-0.40 Mo.	0.70	3.35
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.70
5100 0.60-0.90 Cr.	0.35	3.00
5100 0.80-1.10 Cr.	0.45	3.10
5100 Chrome Spring	0.20	2.85
6100 Bars	1.20	3.85
6100 Spring Steel	0.95	3.60
Chrome Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60
9250 (flats)	0.25	2.90
9250 (rounds, squares)	0.50	3.15

Hot rolled alloy billets 4 x 4-inch and over take same price per gross ton as same specification alloys bars per net ton. Sizes under 4 x 4 to 2½ in. x 2½ in. inclusive sold on bar basis plus steel bar card extras for size. Sizes under 2½ in. x 2½ in. take bar price on net ton basis.

COLD-FINISHED STEEL

Bars, drawn or rolled, Pitts., Chi., Buffalo, and Cleve. c.l.	2.20c
Do, delivered, Detroit	2.435c
Shafting (turned, polished) Pittsburgh, Buffalo	2.20c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.55c to 3.00c

WIRE PRODUCTS

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

	Trade	Jobbers
Standard wire nails	$2.50	$2.40
Cement coated nails	2.50	2.40
Galvanized nails	4.50	4.40
(Per pound)		
Polished staples	2.95c	2.85c
Galvanized staples	3.20c	3.10c
Barbed wire, galvanized	3.15c	3.05c
Annealed fence wire	2.65c	2.55c
Galvanized wire	3.10c	3.00c

Anderson, Ind., $1 higher. Chicago $2 higher, Duluth, Birmingham $3 higher.

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

Bright plain wire, 6 to 9 gage	2.40c
Wire, delivered Detroit	2.57c
Nails, delivered Detroit	$2.58 to 2.72

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Pittsburgh-Cleveland-Ironton base on products made there; Duluth $2 higher; Fairfield, Ala., $3 higher.

CUT NAILS, CHAIN, PILING

Cut nails, c.l., f.o.b. mills	2.70c
Cut nails, l.c.l., f.o.b. mills	2.80c
Sheet piling, base, Pittsburgh	2.20c

Chain proof BB and BBB, Pitts.

3/16-in. to ½-in.	33 1/3 and 5 off
9/16-in. to 1½-in.	33 1/3 off

CAST IRON WATER PIPE

Class B Pipe—Per Net Ton

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	48.20 to 49.20
Six-inch to 24-inch, Chicago	44.20 to 45.20
Six-inch and over, New York	36.50 to 38.50
Four-inch, New York	40.00 to 41.00
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

TIN PLATE; TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35
Gary, Ind., base 10 cents higher.	
Long ternes, primes, No. 24—	4.00c

*Price subject to quantity differentials.

WASHERS

Wrought, c.l., Pitts. dist.	$6.50 to 6.75 off
Wrought, c.l., Chicago dist.	$6.702 to 26.90 off
Lock: to dealers	85-5 off
Lock: to consumers	85 off

RAILS, TRACK MATERIAL

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 29.00
Light rails, 25 to 45, mills	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand. jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.

Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Lag screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off
Stove bolts, 75, 20, 10 and 5 off in pkgs., 75, 10, 10 and 5 with 2½ off in bulk.	
Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-5 off
Upset 1 in. diam. and smaller	5 off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. diam. and smaller	80-10-5 off

RIVETS

Struc., c.l., Pitts.-Cleve.	3.10c
Structural, c.l., Chicago	3.20c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and 10 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Raw Materials and Semifinished Products

SEMIFINISHED STEEL

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pittsburgh, open-hearth	$34.00
Pittsburgh, bessemer	34.00
Youngstown	34.00
Cleveland	34.00
Philadelphia	40.30
Chicago	36.00
Forging, Chicago	41.00
Forging, Pittsburgh	39.00
Forging, Philadelphia	45.30

SHEET BARS

Pittsburgh	$34.00
Youngstown	34.00
Cleveland	34.00
Chicago	36.00

SLABS

Pitts., Young.	34.00
Cleveland	34.00

WIRE RODS

Pittsburgh, Cleveland	$40.00
Chicago	41.00
Youngstown	40.00

SKELP

All grades, Pittsburgh	1.85c to 1.90c

IRON ORE

LAKE SUPERIOR ORE
Per Gross Ton, Lower Lake Ports

Old range bessemer, 51½%	$4.80
Mesabi bessemer, 51½%	4.65
Old range nonbessemer, 51½%	4.65
Mesabi nonbessemer, 51½%	4.50
High phosphorus, 51½%	4.40

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%	9.00 to 10.00
Copper-free low phos. 58-65%	nominal

FOREIGN ORE
Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 10-12% manganese	12.00 to 12.50
North African low phosphorus	12.50
Swedish basic, 65%	10.50
Swedish low phosphorus	12.00
Spanish and North African basic, 50 to 6% (nominal)	11.50 to 12.00
Newfoundland foundry, 55%	nominal
Tungsten future, short ton unit, duty paid	15.25 to 15.50
Chrome ore, 48-50%, long ton c.i.f.	$22.00 to 24.00

MANGANESE ORE

Prices, not including duty, are cents per unit; cargo lots.

Caucasion (52-55 per cent)	30 to 32 cents
Indian (48-50 per cent)	30 to 32 cents
Brazilian (46-48 per cent)	29 to 31 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, import duty paid east, tide., gross ton	$21.00

REFRACTORIES

FIRE CLAY BRICK
Per 1000 f.o.b. works
First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK
Per Net Ton

9 x 4½ x 2½	65.00

MAGNESITE
Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00
Domes., Chewelah, Wash., base	$22.00

CHROME BRICK
Net Ton Chester, Pa., and Baltimore base

9 x 4½ x 2½	45.00

Rails, Cars

$42,000,000 Inquiry Brightens Car Prospects—Awards Absent—Rail Buying Small; Spikes Active

VAN SWERINGEN roads' inquiries for 10,625 freight cars, 91 coaches, 130 locomotives and 55 tenders increase active pending car list to 19,000 or more. December awards tentatively placed at 9110, making 1929 total 105,505. About 50,000 tons of rails; 4000 tons accessories, and 62 engines were placed.

RAILROAD TRACK PRICES, PAGE 62

New York, Dec. 31.—By far the largest equipment inquiry of 1929 was issued by the Van Sweringen group. It comprises 10,625 freight cars, 130 locomotives and 55 tenders and 91 coaches. This equipment will cost more than $42,000,000 and is for the Chesapeake & Ohio, Hocking Valley and Pere Marquette railroads. Van Sweringen interests will probably enter the market later for rolling equipment for Erie and Nickel Plate to cost $57,500,000, bringing total expenditures up to $100,000,000.

A preliminary estimate of 9110 domestic freight cars placed in December, brings the 1929 total to 105,505.

Pittsburgh, Dec. 31.—Backlogs of track fastenings are fair, despite December's seasonal decline. Baltimore & Ohio, about to close on 15,000 kegs of spikes, also wants rails and tie plates. Erie also wants tie plates.

Chicago, Dec. 31.—Rails ordered last week from western mills totaled 45,000 to 50,000 tons, including Burlington's order. About 75,000 tons of rails are on inquiry. Rail mills operate 85 per cent. Track accessory inquiries total 12,000 tons; sales involve about 4000 tons.

LOCOMOTIVES PLACED

Chicago Great Western, 15 locomotives to Lima Locomotive Works.

Seaboard Air Line, eight locomotives, to Baldwin Locomotive Works.

Southern Pacific, 39, to Baldwin Locomotive Works, including 25 combination passenger and freight and 14 passenger.

CAR ORDERS PENDING

Chesapeake & Ohio, 5067, including 2000 50-ton box, 1500 57½-ton high side flat bottom gondolas, 1500 70-ton hoppers, 20 combined pasenger and baggage, 41 steel passenger coaches and 6 mail-express coaches.

Hocking Valley, 1504, including 1500 57½-ton gondolas and 4 passenger coaches.

Pere Marquette, 4145, including 2000 40-ton automobile, 1500 50-ton box, 250 70-ton gondolas, 250 40-ton combination automobile and furniture, 100 50-ton gondolas, 25 cabooses, 8 passenger coaches and 12 baggage and express cars.

LOCOMOTIVE ORDERS PENDING

Chesapeake & Ohio, 75, including 25 freight and 50 switching and 40 tenders.

Hocking Valley, 40, including 25 freight and 15 switching.

Pere Marquette, 15 switching with 15 large tenders.

McCleary Is Hopeful

Youngstown, O., Dec. 31.—Indicating his views on the iron and steel trade prospects for 1930, E. T. McCleary, president of the Republic Iron & Steel Co., made this statement:

"I feel that we can look forward to the year 1930 with optimism. While the recovery may not be as fast as we could wish, yet I feel that on the whole the coming year will be almost if not quite as good as the past year."

Pig Iron Prices

Per Gross Ton	
Bessemer, valley furnace	$19.00
Bessemer, del. Pittsburgh	20.76
Basic, valley furnace	18.50
Basic, Pitts., dist. fur.	19.00
*Basic, del., Pitts.	19.63 to 20.13
Basic del., eastern Pa.	19.50 to 20.00
Basic, Buffalo furnace	18.50
Malleable, valley furnace	19.00
Malleable, Pitts., dist. fur.	19.50
*Malleable, del. Pittsburgh	20.13 to 20.63
Malleable, Cleve. fur. for local del.	19.00
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	20.00
Malleable, del. eastern Pa.	21.26 to 22.76
Malleable, Granite City fur.	20.00
No. 1 foundry, Chicago furnace	20.50
No. 1X, Eastern del., Phila.	22.26 to 22.76
No. 1X, Buffalo furnace	21.00
No. 2 foundry valley furnace	18.50
No. 2 fdy., Pitts. dist. fur.	19.00
*No. 2 foundry, del. Pittsburgh	19.63 to 20.13
No. 2 plain, Buffalo furnace	19.50
No. 2 foundry, Chicago furnace	20.00
No. 2 fdy., Cleve. fur. for local del.	19.00
No. 2 fdy., Granite City	20.00
No. 2 plain, del., Phila.	21.76
No. 2 plain, Virginia furnace	17.75
No. 2 plain, Buffalo, del. Boston	21.91 to 22.41
No. 2 plain, N. J., tidewater	21.26 to 21.76
No. 2 Alabama, Bir. base	14.50 to 15.00
No. 2 Tenn., Birmingham base	14.50 to 15.00
No. 2 Tenn., del. Cincinnati	17.69 to 18.19
No. 2 Alabama, del. Cincinnati	17.69 to 18.19
No. 2 Alabama, del. Cleveland	20.51 to 21.01
No. 2 Alabama, del., Chicago	19.51
No. 2 Alabama, del., St. Louis	19.42
No. 2 Ala., Phila., dock dely.	19.25 to 19.75
No. 2 Ala., Balt., dock dely.	19.00 to 19.50
No. 2 Ala., N. Y., dock dely.	19.00 to 19.50
No. 2 Ala., Boston, dock dely.	20.21
No. 2X, east, N. J., tidewater	21.28 to 21.78
No. 2X, eastern, del. Phila.	21.76 to 22.26
No. 2X, foundry, Buffalo furnace	20.00
No. 2X, Buffalo, del. Boston	21.91 to 22.91
No. 2X, Virginia furnace	18 25
Gray forge, Pitts. dist. fur.	18.50
*Gray forge, del. Pittsburgh	19.13 to 19.63
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.76
Low phos., copper bearing fur.	23.00 to 24.00
Charcoal, Superior, del., Chicago	27.04

*Freight from Pittsburgh district furnace to points in Pittsburgh district 63.00c, 76.00c and $1.13 per ton.

CANADIAN PRICES	
No. 1 foundry, del. Toronto	$23.60
No. 1 foundry, del. Montreal	25.00
No. 2 foundry, del. Toronto	23.10
No. 2 foundry, del. Montreal	24.50
Malleable, del. Toronto	23.60
Malleable, del. Montreal	25.00
Basic, del. Montreal	23.50

Wire

Jobbers Slow to Cover, But Manufacturers Buy Well

WIRE PRICES, PAGE 62

Chicago, Dec. 31.—Holiday interruptions and snow are interfering with specifications for common wire products, but first quarter contracting is active. Western wire mill operations continue at 45 to 50 per cent. December bookings were far below last year. First quarter orders are being booked on the basis of 2.45c, Chicago or western mills, for plain wire, and $2.45 to $2.55 for wire nails.

New York, Dec. 31.—Trading in wire products is slack. One leading seller reports December the slowest month since 1921. Prices of $2.40 and $2.50 for wire nails have been subject to some shading. Such contracting for first quarter as has been done has been largely at these prices. Plain wire is steady at 2.40c, Pittsburgh.

Pittsburgh, Dec. 31.—Manufacturers' wire is in improved demand, but jobbers' products continue slow. Automotive requirements account for most of the gain in the former, with fairly heavy releases received the past few days. Nails are moving slowly. Producers are not active in soliciting first quarter nail contracts. Although some tonnage at lower prices will be carried over into January, new contracts generally take $2.40 to $2.50. Plain wire is firm at 2.40c, with wire rods at $40.

Cleveland, Dec. 31.—Buying of wire and wire products generally has been held back for inventories. The 2.40c, Cleveland price on wire is not entirely firm but $2.40, Cleveland, is adhered to on nails.

H. A. Schwartz To Receive Penton Medal

Announcement has been made of the award of the John A. Penton gold medal, major award of the American Foundrymen's association for 1930, to Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland. Mr. Schwartz was named the recipient for his outstanding contributions to the foundry industry. Presentation will take place at the 1930 convention of the association in Cleveland, the week of May 12. Mr. Schwartz is a prominent figure in the foundry field, being especially noted for his research work on malleable iron. He has been closely identified with the American Foundrymen's association for many years as a contributor of papers, committee worker and convention chairman.

Coke

Easier Price Situation in Quiet Market—Shipments at Chicago Equal November Rate

DEMAND for furnace and foundry coke continues light. Production in the Connellsville district has been further reduced, output being at the lowest point of the year. Beehive furnace fuel a year ago was $2.75. Today the usual figure is $2.60. Surplus coke supplies are now accumulating.

Pittsburgh, Dec. 31.—Beehive furnace coke demand is lacking and the price is easy at $2.60 to $2.65. Orders for foundry fuel also continue light. Despite a further reduction in output, surplus coke still is accumulating. Output for the week ended Dec. 21 was 34,530 tons, against 39,400 tons the preceding week and 58,360 tons in the corresponding 1928 period, according to the *Connellsville Courier*.

New York, Dec. 31.—Sluggishness in demand is reflected in occasional shading of the beehive furnace coke range of $2.75 to $3, Connellsville. Foundry coke is moderately steady at $3.50 to $4.85, Connellsville, and by-product foundry coke at $9 to $9.40, Newark, N. J.; $11, New England; and $9, Philadelphia.

Chicago, Dec. 31.—December by-product foundry coke shipments held to approximately the same level as November. Some contracts for first half are being made on the basis of $8, ovens, or $8.75, delivered in the Chicago switching district.

Cincinnati, Dec. 31.—Specifications for by-product foundry coke in some lines are showing a slight improvement, although demand in general remains comparatively low. Quotations are unchanged.

Birmingham, Ala., Dec. 31.—Order books for coke are about normal. Prices are unchanged.

Tender Uphouse Dinner

Philadelphia, Dec. 31.—A farewell by his associates in the steel business for H. G. Uphouse, for years Philadelphia district manager of the Donner Steel Co. and now being transferred to company headquarters at Buffalo, took the form of a dinner at the Penn Athletic club Dec. 30. W. S. Stephenson, of the American Rolling Mill Co., presided.

Coke Prices

Prices per Net Ton	
Beehive Ovens	
Connellsville furnace	$2.60 to 2.65
Connellsville foundry	3.50 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25
By-Product Foundry	
Newark, N. J., del.	$9.00 to 9.40
Chicago ovens	8.00
New England del.	11.00
St. Louis del.	9.00
Birmingham, ovens	5.00
Indianapolis del.	8.25
Ashland, Ky., ov., Connell. basis	6.50
Portsmouth, O. ov., Connell. basis	6.50
Buffalo ovens	8.75
Detroit ovens	9.00
Philadelphia, del.	9.00

Ferroalloys

Tonnages Continue To Be Placed for 1930 Delivery

New York, Dec. 31.—Contracting for ferromanganese continues at $100 per gross ton, duty paid. Specifications are expected to come out more freely in January. Domestic spiegeleisen, 19 to 21 per cent, is unchanged at $34 in carload lots, furnace.

Pittsburgh, Dec. 31.—Ferroalloy specifications are light. Considerable tonnage remains to be closed for next year. Prices are unchanged.

Chicago, Dec. 31.—Carload orders for ferroalloys for steel foundries are fairly numerous. Some of the large steel foundries are operating at 75 per cent. Contracting for ferroalloys for 1930 is virtually completed.

Coke By-Products

Expect Contract Shipments to Start Jan. 15—Prices Steady

New York, Dec. 31. — Shipments against light oil distillate contracts are expected to start about Jan. 15. Current business is small but prices are steady. Covering for early 1930 requirements has been normal. Outlook for benzol is bright. Toluol stocks are not large. Solvent naphtha and commercial xylol are slow. Phenol prices continue slightly firmer here than in the Middle West. Naphthalene is in large supply. Sulphate of ammonia is inactive and prices are inclined to weakness.

Bolts, Nuts, Rivets

Moderate Business Booked for January —Prices Are Steady

NUT AND BOLT PRICES, PAGE 62

Pittsburgh, Dec. 31.—Bolt, nut and rivet producers have a fair number of orders for January shipment. Railroads continue fair buyers and demand for structural rivets is holding fairly well. The market continues 60 to 70 off for bolts and nuts, and 3.10c, Pittsburgh, for large rivets.

Cleveland, Dec. 31.—Orders are growing more numerous for nuts, bolts and rivets. Their size individually, however, remains small. No price resistance is encountered.

Chicago, Dec. 31.—First quarter contracting for bolts, nuts and rivets virtually is completed. Prices have been generally accepted without change from fourth quarter. Producers' operations are slightly below 50 per cent. Carriage and machine bolts are quoted at 60 to 70 off list.

Foreign News

British Steelworks Resume Full Operations—Continent Quiet

London, Dec. 31.—(*By Cable*)—British steelworks resumed operations practically in full Dec. 30, following a shutdown last week. Recent advances in steel prices have not been tested. The shipbuilding and railroad outlook for first quarter is bright. Demand for pig iron is strong. Cast pipe foundries are well engaged. French and Belgian markets are quiet, steelmakers quoting new minimum prices, without rebates. A report from Berlin states stocks are accumulating at some works.

Tractor Co. Adds Men

Chicago, Dec. 31.—Caterpillar Tractor Co., Peoria, Ill., will add 2000 to 3000 employes within the next 90 days in its enlarged thresher-combine and tractor factories and foundry, which are nearing completion, according to R. C. Force, president. It is stated that the increased facilities of the Peoria plant will bring employment up to about 7000.

Ferroalloy Prices

(In dollars, except ferrochrome)

*Ferromanganese, 78 to 82 per cent tidewater, duty paid	$100.00
*Ferromanganese, del. Pittsburgh	104.70
Spiegeleisen, 19 to 21 per cent, domestic furnace spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do., less carload	88.50
Do., 75 per cent	130.00 to 15.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.45 to 1.50
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producer's plant, net ton	160.00
Do., one ton to carload	170.00
Ferrophosphorus, per ton, carload 17 to 19 per cent, Rockdale Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Carloads. Differentials apply to large quantities.

*These prices contract, spot $5 higher.

Scrap

Year Closes with Light Trading and Relative Scarcity—Prices Nominal and Unchanged

WHILE buying of iron and steel scrap is light and usually for immediate needs only, inquiry indicates interest in future needs. Dealers are wary about taking tonnage contracts for more remote delivery, being uncertain of being able to buy at a profit on present levels. Increased strength is shown.

Chicago, Dec. 31.—Consumer bookings of iron and steel scrap have dwindled to a mere shadow of recent tonnage, making it difficult to gage actual market prices. Dealers are paying higher than the nominally quoted consumer levels, to cover orders. Buying to fill orders constitutes the chief activity. Railroad lists are being closed at higher levels, heavy melting steel on the recent Santa Fe list having been sold at $13.50, delivered in the Chicago switching district, while no recent consumer sales at higher than $13 have developed. Scrap shipments to steelworks melters are about 50 per cent of the volume six to eight weeks ago.

New York, Dec. 31.—Lukens Steel Co., Coatesville, Pa., has closed on approximately 10,000 tons of heavy melting steel at $14.50, delivered, it is reported here. Dealers' buying prices are unchanged.

Pittsburgh, Dec. 31.—Scrap buying is light but the market is strong. Dealers are not interested in large orders at current prices but are able to obtain $16 on small lots of heavy melting steel, and this grade is quot-

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	10.50 to 13.50
Boston, dealers	9.50 to 10.00
Boston, No. 2	10.50 to 11.00
Buffalo, No. 1	14.00 to 14.50
Buffalo, No. 2	12.50 to 12.75
Chicago	12.50 to 13.00
Cincinnati, deal.	12.00 to 12.50
Cleveland, No. 1	13.00 to 13.50
Cleveland, No. 2	12.50 to 13.00
Detroit, No. 1 deal.	12.00 to 12.50
Detroit, No. 2 deal.	9.75 to 10.25
East Pa., del. mill	14.50
N. Y., deal. R. R.	11.50 to 11.85
N. Y., deal. yd.	7.75 to 8.00
Pittsburgh, No. 1	15.50 to 16.00
St. Louis, No. 1	13.00 to 13.50
Valleys, No. 1	14.50 to 15.50

COMPRESSED SHEETS

Buffalo (dealers)	12.50 to 12.75
Chicago	11.25 to 11.75
Cleveland	12.50 to 13.00
Detroit, dealers	11.50 to 12.00
E. Pa. new mat.	13.00 to 13.50
Pittsburgh	15.00 to 15.50
Valleys	14.50 to 15.00

BUNDLED SHEETS

Buffalo	9.50 to 10.00
Cincinnati, deal.	10.25 to 10.75
Cleveland	11.00 to 11.50
Eastern Pa.	11.50
Pittsburgh	14.00 to 14.50
St. Louis	9.00 to 9.50

SHEET CLIPPINGS LOOSE

Chicago	7.50 to 8.00
Cincinnati	8.00 to 8.50
Detroit, dealers	8.50 to 9.00
St. Louis	9.00 to 9.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston, dealers	8.50 to 10.00
Buffalo	17.50 to 18.00
Chicago (3 feet)	15.75 to 16.25
Chicago, 2 ft. and under	17.50 to 18.00
Cincinnati, deal.	17.50 to 18.00
Detroit, dealers	16.00 to 16.50
Pittsburgh (3 ft.)	18.00 to 19.00
Pittsburgh, 2 feet and under	18.50 to 19.50
St. Louis	17.50 to 18.00

STOVE PLATE

Birmingham	11.00 to 12.00
Boston consumers	9.00 to 9.75
Buffalo	12.00 to 12.25
Chicago, net	10.25 to 10.75
Cinn., deal., net	8.75 to 9.25
Detroit, net, deal.	9.00 to 9.50
Eastern Pa.	11.00
N. Y., deal., mill	7.75 to 8.00
St. Louis	12.00 to 12.50

COUPLERS, SPRINGS

Buffalo	17.00 to 17.50
Chicago	15.50 to 16.00
Eastern Pa.	19.50 to 20.00
Pittsburgh	20.00 to 20.50
St. Louis	14.50 to 15.00

ANGLE BARS—STEEL

Chicago	14.75 to 15.25
St. Louis	13.50 to 14.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	17.50 to 18.00
Cleve. billet and bloom crops	17.00 to 17.50
Eastern Pa.	21.00 to 22.00
Pitts. billet and bloom crops	21.00 to 21.50
Pitts. sheet bar crops	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	13.00 to 13.50
St. Louis	14.00 to 14.50

SHOVELING STEEL

Chicago	12.50 to 13.00
Cleveland	11.00 to 11.50
St. Louis	13.00 to 13.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	10.00 to 11.00
Boston, dealers	10.50 to 10.75
Buffalo, No. 1	11.00 to 11.50
Buffalo, No. 2	14.00 to 14.50
Chicago, No. 1	13.20 to 13.75
Chicago, No. 2	12.50 to 13.00
Cincinnati, No. 2	12.00 to 12.50
Eastern Pa.	16.00 to 16.50
N. Y., No. 1 deal.	12.00 to 12.50
Pittsburgh, No. 2	15.50 to 16.00
St. Louis, No. 1	12.25 to 12.75
St. Louis, No. 2	13.00 to 13.50

SPECIFICATION PIPE

Boston	8.00 to 9.00
Eastern Pa.	14.00
New York, deal.	9.25 to 9.75

BUSHELING

Buffalo, No. 1	12.50 to 12.75
Chicago, No. 1	10.75 to 11.25
Cinn., No. 1 deal.	10.00 to 10.50
Cinn., No. 2	6.50 to 7.00
Cleveland, No. 1	12.00 to 12.50
Cleveland, No. 2	9.25 to 9.75
Detroit, No. 1 new deal.	10.75 to 11.25
St. Louis, No. 1	9.25 to 9.75
Valleys, new No. 1	14.00 to 14.50

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston, dealers	6.00 to 6.10
Buffalo	9.00 to 9.50
Chicago	6.50 to 7.00
Cincinnati, deal.	8.00 to 8.50
Cleveland	9.00 to 9.50
Detroit	8.25 to 8.50
Eastern Pa.	11.00
New York, deal.	7.00 to 7.50
Pittsburgh	10.00 to 10.50
St. Louis	6.75 to 7.25
Valleys	10.00 to 11.00

MIXED BORINGS, TURNINGS
For Blast furnace use

Boston, dealers	5.75 to 6.10
Buffalo	11.00 to 11.50
Cincinnati, deal.	8.25 to 9.25
Cleveland	9.50 to 10.00
Detroit, dealers	9.75 to 10.00
Eastern Pa.	11.00
New York, deal.	7.00 to 7.50
Pittsburgh	10.50 to 11.00

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	6.00 to 7.00
Boston, chem.	9.00 to 9.50
Boston, dealers	6.00 to 6.10
Buffalo	11.00 to 11.50
Chicago	9.25 to 9.75
Cincinnati, deal.	8.25 to 8.75
Cleveland	9.50 to 10.00
Detroit, dealers	9.00 to 9.50
Eastern Pa.	11.50
Eastern Pa., chem.	14.50
New York, deal.	7.00 to 7.50
Pittsburgh	10.50 to 11.00
St. Louis	9.25 to 9.75

PIPE AND FLUES

Cincinnati, deal.	9.00 to 9.50

RAILROAD GRATE BARS

Buffalo	11.00 to 11.50
Chicago, net	11.50 to 12.00
Cincinnati	9.50 to 10.00
Eastern Pa.	11.00
New York, deal.	7.50 to 8.00
St. Louis	11.50 to 12.00

FORGE FLASHINGS

Boston, dealers	8.00 to 8.50
Buffalo	12.50 to 12.75
Cleve. over 10 in.	11.00 to 11.50
Detroit	11.00 to 11.50

FORGE SCRAP

Boston, dealers	8.00 to 8.50
Chicago	17.25 to 17.75
Eastern Pa.	13.50 to 14.00

ARCH BARS AND TRANSOMS

Chicago, net	17.25 to 17.75
St. Louis	19.00 to 19.50

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	13.50 to 14.00
Chicago steelworks	10.50 to 11.00
Cleveland	12.00 to 12.50
Eastern Pa.	13.50
Pittsburgh	14.00 to 14.50
St. Louis	10.00 to 10.50

STEEL CAR AXLES

Birmingham	17.00 to 17.50
Boston, ship point	15.50 to 16.00
Buffalo	17.50 to 18.00
Chicago	17.65 to 18.20
Eastern Pa.	20.00 to 21.00
Pittsburgh	20.50 to 21.00
St. Louis	18.50 to 19.00

SHAFTING

Boston, ship point	13.50 to 14.00
Chicago	16.50 to 17.10
Eastern Pa.	19.00
New York, deal.	14.00 to 14.50
St. Louis	17.50 to 18.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	11.00 to 12.00
Boston, iron	14.00 to 14.50
Buffalo, iron	12.50 to 13.00
Buffalo, steel	17.50 to 18.00
Chicago, iron	14.00 to 14.50
Chi., rolled steel	17.00 to 17.50
Cincinnati	12.00 to 12.50
N. Y., iron, deal.	10.50 to 11.00
Pittsburgh, iron	14.50 to 15.00
Pittsburgh, steel	20.00 to 20.50
St. Louis, iron	13.75 to 14.25
St. Louis, steel	16.00 to 16.50

NO. 1 CAST SCRAP

Birmingham, cup	12.00 to 13.00
Buffalo	14.00 to 14.50
Boston, textile	14.00 to 14.50
Chicago, mach.	15.10 to 15.70
Chicago, railroad	14.30 to 14.85
Chicago, agri.	12.35 to 12.90
Cincinnati, mach. cupolas, gross	18.25 to 18.75
Cleveland, cupola	15.00 to 15.50
Detroit, net, deal.	11.50 to 12.00
East Pa., cupola	16.00
N. Y. cup. deal.	10.85
N. Y., del. local foundries	15.00
Pittsburgh, cupola	14.50 to 15.00
San Fran., del.	13.50 to 14.00
Seattle	14.50 to 14.75
St. L. No. 1 mach.	14.50 to 15.00
St. Louis, No. 1	14.00 to 14.50

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	10.25 to 10.75
Cleve., breakable	12.00 to 12.50
Detroit, auto, net dealers	12.00 to 13.00
Detroit, break. deal	9.50
Eastern Pa.	14.00 to 14.50
New York, deal.	9.75 to 10.50
Pittsburgh	11.50 to 12.00

MALLEABLE

Boston, railroad	18.50 to 19.00
Buffalo	17.00 to 17.50
Chicago, agri.	13.75 to 14.25
Chicago, railroad	16.50 to 17.00
Cinn., R. R. deal.	15.25 to 15.75
Cinn., agri., deal.	14.25 to 14.75
Cleveland, rail	17.00 to 17.50
Detroit auto deal.	14.50 to 15.00
St. Louis, rail	14.00 to 14.50

Miscellaneous Scrap

RAILS FOR ROLLING

5 feet and over

Birmingham	13.00 to 14.00
Boston	10.50 to 10.75
Buffalo	14.00 to 14.50
Chicago	14.50 to 15.00
Eastern, Pa.	15.50
New York	10.50 to 11.00
St. Louis	14.50 to 15.00

LOCOMOTIVE TIRES

Chicago, cut	18.00 to 18.50
St. Louis, No. 1	14.50 to 15.00

LOW PHOS. PUNCHINGS

Chicago	14.75 to 15.25
Pittsburgh	19.00 to 19.50

able 50 cents higher at $15.50 to $16. Offerings are moderate and quality grades are scarce.

Philadelphia, Dec. 31.—Dealers complain that scrap is not available in needed tonnages and are not anxious to sell tonnages ahead. Current sales are in small and moderate lots at unchanged prices.

Buffalo, Dec. 31.—There are indications that two large district melters who have placed embargoes on scrap shipments will lift them soon after Jan. 1.

Cleveland, Dec. 31.—No releases for shipment of steel scrap have been made and the market is dormant except for limited dealer trading.

Cincinnati, Dec. 31.—Little activity is shown in iron and steel scrap. Prices are unchanged. On several grades quoted prices may be considered nominal but those on heavy melting steel are considered firm.

Detroit, Dec. 31.—Iron and steel scrap is quiet, without signs of renewed activity for the present. An underlying firmness is evident and a few prices have firmed fractionally.

Birmingham, Ala., Dec. 31.—Lack of activity continues in iron and steel scrap and prices are nominal. Heavy melting steel alone shows activity. Ample supplies are available.

Toronto, Ont., Dec. 31.—Holiday quiet has almost extinguished dealing in iron and steel scrap. Only immediate needs are being covered. Some inquiry presages better buying soon.

Strip Steel

Demand Is Slow and Mills are Operating at Low Rate

STRIP PRICES, PAGE 62

Pittsburgh, Dec. 31.—Strip steel producers continue the low operations of last week. The average for several plants does not run over 20 per cent and for the industry as a whole little more. Heavier schedules are planned after Jan. 1 but in view of continued poor buying for automotive purposes only a moderate upturn is expected. With the exception of Ford, automotive releases continue light. The market is fairly steady at 1.90c and 2.00c, Pittsburgh, for hot strip and 2.75c for cold-rolled strip although current tonnage is insufficient to provide a thorough test.

Philadelphia, Dec. 31.—Hot-rolled strip continues at 1.80c to 1.90c and 1.90c to 2.00c, according to width, and cold-rolled strip is 2.65c to 2.75c.

New York, Dec. 31.—Consumers of strip steel are entering the market slowly for first quarter requirements, with prices on hot strip unchanged at 1.90c to 2.00c, Pittsburgh, depending on width, and cold rolled strip at 2.75c.

Cleveland, Dec. 31.—Hot and cold strip specifications have increased only slightly. Some makers note no increase whatever but have booked some orders for January-February shipment. Some larger cold strip consumers have paid 2.65c, Cleveland or Pittsburgh, base. Hot strip has sold at 1.80c to 1.90c, Pittsburgh, on wide and 1.90c to 2.00c, base, Pittsburgh, on narrow.

Nonferrous

Copper Inquiry Heavier—Lead and Zinc Quiet—Tin Off

New York, Dec. 31.—Consumer inquiry for copper has increased following an extremely quiet period most of last week. Actual sales have been mostly for small lots and early shipment. Prices have held firm and unchanged at the 18-cent level, Connecticut basis. One or two large inquiries have been reported.

Straits tin quotations have fluctuated in a market of light demand. The week's closing price on spot metal dropped to 39.25c, being easy on expectation of weak December statistics. A little buying has been done lately for shipment three and four months ahead at about 1 cent premium.

Lead has continued in a quiet but firm market with prices at 6.10c, East St. Louis, and 6.25c, New York. Zinc market also has been quiet but prices easy at 5.45c, East St. Louis, on prime western. Zinc market as a whole has not been so weak as recently following good buying.

Sheets

Specifications and Orders Increase—Automotive Shipments Larger—Valley Operations Up

SHEET demand is more active. Contracting is heavier at Pittsburgh, and new orders and specifications received by valley mills enabled them to resume operations Monday at 65 to 70 per cent. The automotive industry is taking larger shipments. Chicago mills have booked a substantial tonnage for first quarter.

SHEET PRICES, PAGE 61

Pittsburgh, Dec. 31.—Sheet contracting is heavier, automotive tonnage showing an increase over preceding weeks. Mill operations average 50 to 55 per cent. Prices generally are unchanged.

New York, Dec. 31.—Sheet demand is quiet, and prices are unchanged. Black sheets quoted 2.75c, base, Pittsburgh, are subject to occasional shading of $1 a ton.

Philadelphia, Dec. 31.—Sheet demand shows more life, a number of mills having received specifications covering first quarter shipments. Prices are unchanged.

Cleveland, Dec. 31.—A small amount of automotive sheet business has been booked and more buying is expected early in January. Prices are easier. Some of the large buyers of full finished have been quoted 3.90c, Pittsburgh, against a recent minimum of 4.00c. One maker has announced 2.85c as a minimum on black but others quote 2.75c. Galvanized can be had at 3.40c, although 3.50c still is named.

Youngstown, O., Dec. 31—Steady inflow of new sheet business in the past week has resulted in independent mills here starting off this morning at 65 to 70 per cent of capacity. Rush shipments are the rule for full-finished and blue annealed specifications. Quotations generally are firm.

Chicago, Dec. 31.—Sheet mills are down to 50 to 60 per cent. One producer has his hot mills in Milwaukee down entirely and has reduced Indiana Harbor production. First quarter contract tonnage on mill books has reached a substantial total. It is indicated shipments of sheets for 1929 will show a gain of 3 to 5 per cent over 1928. Black sheets are being shaded in southerly territory, but producers state the price of 2.85c, mills, for No. 24 gage is being obtained in this territory.

Warehouse

Sales Small—Galvanized Sheets Down In East—Nails Firmer In West

New York—Some jobbers quote 4.25c on galvanized sheets, 50 bundles or more, and 4.50c on less. Because this reduces profits measurably, some have not yet taken this action. Black sheets are none too firm at 3.90c. Seasonal dullness is reflected in demand.

Philadelphia—Jobbers note usual year-end quietness. Prices are firm and unchanged but quantity differentials and cutting extras on cold finished bars may be changed.

Chicago—Most warehouses report December business lighter than last year, but close to November, 1929. Bar mill products move well, due in part to the increased buying of special analysis and alloy bars. Sheet jobbing is relatively light. Nails are more stabilized at $2.80 to $2.95.

Cincinnati—Jobbers note the customary holiday decrease in sales. Inventories are being held low. Tonnage for 1929 will be larger than 1928.

Cleveland—Iron and steel jobbers here are filling small lot orders. Manufacturers generally are withholding purchasing. Prices are steady. The prospects for early 1930 business are considered bright.

Bars

Fair Tonnages on Books for First Quarter—Prices Firm at Recent Level

MODERATE bookings of steel bars have been made for first quarter at the prevailing price, which is steady. Some makers find specifications unusually good for this season. Automotive requirements are growing heavier but lack much of being satisfactory to producers.

BAR PRICES, PAGE 61

Chicago, Dec. 31.—Several major bar consuming lines have order books of 60 days and more. Soft steel bar contracting shows slightly more vigor. Sellers of deformed bars report light business, but building prospects are good for the early months of the year. Little alloy steel bar tonnage is being placed in this market. Soft steel bars are quoted at 2.00c, Chicago, with differentials for tonnage.

Philadelphia, Dec. 31.—Steel bar specifications are unusually good for midwinter and considerable tonnage is under contract for first quarter. The price is firm at 1.90c, Pittsburgh.

Pittsburgh, Dec. 31.—Merchant bar producers have an accumulation of orders for shipment after the first of the year, but the tonnage is moderate. Automotive requirements are heavier, but the industry is slow in making extended commitments. The market remains steady at 1.90c, Pittsburgh.

Cleveland, Dec. 31.—Bar tonnage is expanding a trifle. Some outside mills continue to quote 1.90c, Cleveland or Pittsburgh, but some quote 1.87½c, delivered Cleveland, and local mills name 1.85c, Cleveland, to large tonnage buyers.

Cold Finished Steel

Demand Offers Little Encouragement for Early Buying

COLD FINISHED PRICES, PAGE 61

Pittsburgh, Dec. 31.—Demand for cold-finished steel bars and shafting from the automotive industry offers little encouragement for an active January. Only moderate releases have been received. Shipments to other industries are off seasonally and total December tonnage shows a decrease from November and the corresponding 1928 month. The market is generally firm at 2.20c, Pittsburgh.

Cleveland, Dec. 31.—While two or three large users of cold finished bars have been actively specifying, others have held business back for inventories. The 2.20c, Cleveland price is held.

Plans Sales Conference

The Ohio Electric & Controller Co., 5900 Maurice avenue, Cleveland, will hold its annual sales conference in Cleveland, Jan. 13 to 17. The conference will be attended by all of its motor and magnet representatives in the United States.

Pipe

Utility Needs Large—Part of 8000-ton Inquiry Placed

PIPE PRICES, PAGE 62

New York, Dec. 31.—Federal water service closed on part of its 8000-ton inquiry. Other utility contracts to be closed by Jan. 15, total 20,000 tons and New York City will buy yard stocks early, about 10,000 tons. Prices are weak.

Pittsburgh, Dec. 31.—Tubular mill operations are 40 per cent on account of slow markets. Jobbers maintain minimum stocks. Line pipe business is not expected until spring. Locomotive and boiler tubing are fair.

Cleveland, Dec. 31.—A few standard pipe orders, 50 to 200 tons, are being placed but in general jobbers have curtailed buying on account of inventory. Recent orders are for shipment on or after Jan. 2. Some producers are shipping now but invoicing as of that date.

Chicago, Dec. 31.—Pressure pipe producers operate under 50 per cent. Some plants are taking inventories. Only occasional carload business is reported. Aside from Milwaukee's large tonnage no outstanding water pipe business is pending. Prices are untested.

Birmingham, Ala., Dec. 31.—Several lettings and increased specifications are bringing about plant resumption. Spring buying promises to be heavy.

CONTRACTS PENDING

Unstated tonnage, 36-inch, for main extension, Buffalo; $525,000 appropriation sought to cover.

Moves Cleveland Office

Cleveland, Dec. 31.—Cleveland headquarters of Youngstown Sheet & Tube Co., Youngstown, O., will be transferred from the twentieth floor Union Trust building to larger quarters at 2400 Terminal Tower building, Jan. 18.

Plates

Market Moderately Active—Oil, Railroad and Shipbuilding Requirements Brighten Outlook

OIL field, railroad and shipbuilding work gives the plate market a favorable outlook. Van Sweringen railroads are inquiring for 130 locomotives and 55 tenders, requiring 4000 to 5000 tons of plates. Oil field inquiry at Chicago totals 5000 tons. Two tankers awarded by Standard Oil of New Jersey require 8000.

PLATE PRICES, PAGE 61

Chicago, Dec. 31.—Oil tankage inquiry in Oklahoma and other southwestern fields totals about 5000 tons. A local fabricator booked 1800 tons for oil refinery work in Oklahoma. Specifications from car companies are fair and shipments for oil and gas line fabrication are holding up well. Plate mill operations have declined slightly to 70-75 per cent. Contract negotiations are based on 2.00c, Chicago.

New York, Dec. 31.—Plates are steady at 2.00c to 2.05c, Coatesville. Ship work includes 8000 tons for two tankers for the Standard Oil Co. of New Jersey, awarded to Sun Shipbuilding & Dry Dock Co.

Philadelphia, Dec. 31.—Plate demand is unusually good for this season, and makers feel cheerful over prospective railroad and ship requirements. Baldwin Locomotive Works has booked 39 locomotives for Southern Pacific, requiring about 1000 tons of plates. Prices are steady.

Pittsburgh, Dec. 31.—Prospects for a moderate upturn in plate demand are regarded as favorable.

CONTRACTS PLACED

8000 tons, two tankers for Standard Oil Co. of New Jersey, to Sun Shipbuilding & Dry Dock Co.

2400 tons, steel pipe for Detroit, reported placed through Mark Hanna, Detroit contractor.

1800 tons, refinery work for Empire Oil & Refining Co., in Oklahoma, to unstated Chicago district fabricator.

Shapes

Inaction Holds Lettings and Inquiries Down—Much Work Projected—Prices Holding

WANING inquiries and shrinking awards characterized last week. Early 1930 prospects are bright, much bridge and industrial construction being up. A 1750-ton bridge was let at Cincinnati. Fabricators operate 85 per cent, specifying rates being good. Two Philadelphia bridges involve 3600 tons.

STRUCTURAL SHAPE PRICES, PAGE 61

New York, Dec. 31.—Lettings declined. Pending tonnage for early 1930 award remains large, including one subway and several municipal projects. Mills operate at high rates. Steady prices are shaded on large lots. Railroads are about to open bids on first quarter needs.

Philadelphia, Dec. 31.—Plain standard shapes continue 1.85c to 1.95c, base, mill, subject to occasional concessions on attractive lots.

Pittsburgh, Dec. 31.—Shape awards are off but inquiry holds. Considerable industrial construction is carried over to 1930. Action on bridges is scheduled for early spring. The market continues 1.90c, Pittsburgh.

Cleveland, Dec. 31.—Structural inquiries have been limited to 30 to 90-ton jobs. Some awards are noted in that range. Larger work is in abeyance but will be released shortly. Specifications are sustained. Plain material is 1.90c, Pittsburgh.

Chicago, Dec. 31.—Bridge work, supporting the 1929 structural market, still leads. Building awards are light but much work of this character is forming. One shape mill reports structural business to Dec. 1 one per cent ahead of 1928, without residences. Plain material is 2.00c, base, Chicago.

Awards Compared

	Tons
Awards this week	7,169
Awards last week	57,115
Awards two weeks ago	98,030
Awards this week in 1929	22,475
Average weekly awards, 1929	42,213
Average weekly awards, 1930	7,169
Average weekly awards, Dec.	50,529
Total awards to date, 1929	22,475
Total awards to date, 1930	7,169

CONTRACTS PLACED

1750 tons, Chesapeake & Ohio railroad viaduct as part of Union terminal, Cincinnati, to Mt. Vernon Bridge Co.
1338 tons, San Luis Rey river bridge, San Diego county, Calif., to United States Steel Products Co.
1000 tons, Roosevelt road bridge, Chicago, to American Bridge Co.; previously reported to unstated fabricator.
950 tons, factory, Johns-Manville Co., Inc., Manville, N. J., to American Bridge Co.
700 tons, apartment, West Ninety-second street, New York, to Drier Iron Works.
550 tons, apartment, Hanson place, Brooklyn, N. Y., to Berkshire Steel Co.
400 tons, public school No. 87, Bussing and Edson avenues, Bronx, N. Y., to Bethlehem Fabricators Inc.
400 tons, pier extension, Canadian National railway, Vancouver, B. C.; general contract to Northern Costruction Co.; steel fabrication to unnamed interest.
375 tons, North Central college, Naperville, Ill., to unstated fabricator.
300 tons, hospital, West Reading, Pa., to McClintic-Marshall Co.
136 tons, grandstand, Riverside, Calif., to unnamed interest.
300 tons, psychopathic hospital, Philadelphia, to American Fabricated Steel Co., instead of to American Bridge Co., as incorrectly reported last week.
150 tons, addition, Republic Carbon Co., Niagara Falls, N. Y., to McClintic-Marshall Co.
120 tons, addition, Lamson & Sessions Bolt Co., Birmingham, Ala., to Virginia Bridge & Iron Co.

CONTRACTS PENDING

2400 tons, Arch street viaduct, Philadelphia; low bidder, Seeds & Dedham.
1600 tons, 10-story warehouse, West Twentieth street, New York.
1200 tons, Henry avenue bridge, Philadelphia; low bidder, Francis Canuso & Sons.
1000 tons, eight airport hangars, Barren Island, New York; bids on general contract Jan. 7.
600 tons, bridge work, Camden, Ark., St. Louis-San Francisco railroad.
550 tons, coal handling bridge, Milwaukee.
150 tons, building addition, Van Dam street, New York.
100 tons, Nickel Plate railroad suspension bridge, Kinsman road, Cleveland; bids rejected, project to be redesigned.
100 tons, Nickel Plate railroad bridge, Buffalo creek near Buffalo. Bids in Dec. 27.

Concrete Bars

Inquiries Dull — Awards Fewer — Chicago Schools Will Take 5000 Tons

QUIETNESS marked the final week of 1929. Albany's filtration plant will take 1000 tons. Chicago board of education plans schools taking 5000 tons. A 500-ton Long Island City, N. Y., factory was let. Approaches for a Chicago bridge, 400 tons, went to an unstated fabricator. Prices are weak.

REINFORCING BAR PRICES, PAGE 61

New York, Dec. 31.—Concrete work up for figures is large in volume. A 1000-ton filtration plant at Albany is to be closed this week. Prices are fairly firm, 1.95c to 2.00c, Pittsburgh, for mill lengths and 2.70c, warehouse.

Pittsburgh, Dec. 31.—Lettings declined as usual in December but compare favorably with December, 1928. A Dayton, O., terminal is up, 1000 tons. Prices are 1.95c, Pittsburgh, for stock and 2.20c for cut lengths.

Chicago, Dec. 31.—Rail steel reinforcing bar tonnage for the year is estimated at about 25 per cent under 1928; billet bars about 30 to 35 per cent less. Active building is limited but much preliminary tonnage is being estimated. Chicago board of education intends to build 10 schools requiring 5000 tons. Recent bids indicate a range for billet bars of 1.90c to 2.00c. Rail bars are under 1.85c.

Buffalo, Dec. 31.—Reinforcing bar sales are small. First quarter bookings are fair. Little tonnage in sight for early placement.

Awards Compared

	Tons
Awards this week	1,974
Awards last week	2,745
Awards two weeks ago	3,457
Awards this week in 1929	3,478
Average weekly awards, 1929	5,849
Average weekly awards, 1930	1,974
Average weekly awards, Dec.	3,656
Total awards to date, 1929	3,478
Total awards to date, 1930	1,974

CONTRACTS PLACED

500 tons, factory, Long Island City, N. Y., to Truscon Steel Co.
400 tons, approaches, Wabash avenue bridge, Chicago, to unstated fabricator.
356 tons, paving in Los Angeles county, Sacramento, Calif., general contract to Jahn & Bressi; steel to unnamed interest.
267 tons, two bridges, Santa Ana, Calif., to unnamed interest.
128 tons, San Luis Rey river bridge, Sacramento, Calif., to unnamed interest.
119 tons, cell house, Florence, Ariz., to Soule Steel Co.
104 tons, for city of Los Angeles, to Los Angeles Iron & Steel Co.
100 tons, paving work in Honolulu, to unnamed interest.

CONTRACTS PENDING

1000 tons, Dayton, O., Union terminal.
450 tons, runways and concrete apron, airport, Barren Island, New York.
350 tons, apartment building, Chicago.
100 tons, college building, Canton, O.; bids in Dec. 27.
Unstated tonnage, chemistry building, University of Illinois, Urbana, Ill.

Operating Rates

Year End Operations Low—Optimism Expressed for January

Buffalo—Production of ingots for this week will represent less than 40 per cent. Tentative production schedules immediately after Jan. 1 call for about a 50 per cent rate.

Pittsburgh—Ingot production averages about 55 per cent, the lowest of the year. Sheet output is 50 to 55 per cent, with tin plate 70 to 75. Strip schedules average 20 to 30 per cent, and pipe 40.

Youngstown, O.—The valley sheet industry will run through the week at 55 to 60 per cent, with hot strip and tin mils at 85 to 90, blue annealed at 65 to 70, common black at 55 to 60, plate mills at 60, and bar mills at 50 per cent. Most sheet mills will be compelled to operate right through New Year's day to the end of the week. Mills express confidence that normal operating rates will be effected by the end of January.

Chicago—The ingot rate is down at 50 to 55 per cent. Illinois Steel Co. banked one stack each at Gary and Joliet, leaving 11 out of 27 furnaces active. Both will be relighted shortly after New Year's. Twenty of the 36 steelworks furnaces are active.

Semifinished

Demand Is Light, Despite Easier Price Trend

SEMIFINISHED STEEL PRICES, PAGE 62

Pittsburgh, Dec. 31.—Despite some clarification of the price situation in semifinished steel, contracting continues light. The market generally has settled to $34 for rerolling billets, sheet bars and slabs, with forging billets taking the usual $5 preferential. Wire rods are firm at $40.

Philadelphia, Dec. 31.—Billet prices have not been revised, and some makers say they will make no reduction from $35, base, Pittsburgh, for rerollers, and $40 for forging quality.

Chicago, Dec. 31.—Producers have accumulated fair stocks of semifinished material. Quotations for rerolling billets and sheet bars are $36, base, Chicago. Wire rods are unchanged at $41, Chicago, or $40, Pittsburgh-Cleveland.

Pullman, Standard Car, Osgood Merging

Pullman Inc., Standard Steel Car Co. and the Osgood-Bradley Car Co. are to be merged. Pullman Inc. stockholders will vote Jan. 28 on a proposal to increase shares from 3,375,000 to 3,875,000, the new stock to be used to retire Standard and Osgood-Bradley issues.

J. F. Drake, president of the Standard company, is to become chairman of Pullman Inc.; D. A. Crawford is president of both Pullman Inc. and the Pullman Co.; P. H. Joyce, vice president of the Standard company and former president of the Illinois Car & Mfg. Co., will become president of the Standard-Bradley group; C. A. Liddle remains president of the Pullman Car & Mfg. Corp.

The Standard, including the Middletown Car Co., and the Osgood-Bradley companies, will be operated separately from the Pullman Car & Mfg. Corp.

Combustion Engineering Committee Formed

New York, Dec. 31.—A committee has been formed to protect the interest of creditors of the International Combustion Engineering Corp., this city, and its subsidiary companies. The committee is composed of George L. Bourne, president, the Superheater Co., New York, as chairman; H. J. Hirshman, treasurer, National Tube Co., Pittsburgh; R. E. McMath, vice president and secretary, Bethlehem Steel Co., Bethlehem, Pa.; Frank J. O'Brien, president, Globe Steel Tubes Co., Milwaukee; and Homer D. Williams, president, Pittsburgh Steel Co., Pittsburgh.

Shearman & Sterling will act as counsel for the committee and George E. Turner, 52 Wall street, as secretary. The committee has invited all present to communicate their names and addresses, together with the amount of their claims to the secretary.

Iron Ore Indusy Reflects Many Changes

(*Concluded from Page* 35)

of novel design and has capacity to treat 400 tons per hour.

The installation at this property constitutes the second complete electrification of an open pit iron ore mine on the Mesabi range, having been preceded by that at the Wabigon mine of the same company, located near the village of Buhl.

The Hanna company has taken the initiative in electrification of open pit mines, and another interesting development is at the Susquehanna mine, Mesabi range. This is the property of the Susquehanna Ore Co., jointly owned by the Republic Iron & Steel Co., Inland Steel Co., and National Steel Corp. The pit had become so deep that it became impractical to haul out the ore in the usual method, and therefore a modified milling system was adopted. In this system the ore is loaded by electric shovels into small cars which are hauled through tunnels to a shaft and hoisted to surface in skips. A five-compartment shaft was sunk from surface adjacent to the pit, and two tunnels have been driven from the shaft to the pit. The first tunnel was driven at a depth of 290 feet, and is used for hauling the ore to the shaft, while the second, at a depth of 350 feet, is used for drainage. When the ore tributary to the upper tunnel has been removed the shaft will be sunk deeper and a third tunnel driven at a depth of 410 feet. The second tunnel will then serve for haulage with the third for drainage. The bottom ore will be hauled through the third tunnel. An innovation in haulage equipment is used in that the usual electric locomotives are replaced by what are termed "locomotive cars," and each of these handles a train of six trailer cars.

A new shaft was sunk at the Agnew mine, Mesabi range, by the Wisconsin Steel Co. The mine was formerly operated as an open pit and has been idle some years.

Open pit operations at the Wade mine, Mesabi range, ended in 1929, and the Cleveland-Cliffs company is preparing to start underground operations. The Helmer mine, adjoining the Wade, was exhausted during the year. Another mine on the Mesabi, the Laura, near Hibbing also was exhausted. Cleveland-Cliff's Republic mine, Marquette range, one of the oldest mines in the Lake Superior district, was finally closed.

Pickands, Mather started to ship from the new Orwell mine adjoining the Danube, Mesabi range, and also extended stripping operations at several other mines. This company has ordered two semirevolving type shovels, the first ever built, for use at the Mahoning mine.

The new Tilden siliceous ore, open pit mine of the Cleveland-Cliffs company, Marquette range, started shipments in 1929, with 439,000 tons.

Shenango Furnace Co. opened its new Virginia mine, Mesabi range, and reopened the Webb underground mine, idle for several years.

Oliver Iron Mining Co. gave up its lease on the Wanless mine, Mesabi range. Some of the underground mines in the Chisholm district are nearing exhaustion, and the Oliver company is reported contemplating opening some new properties. This company has started shipping from its new Geneva mine, Gogebic range, at a level of 3150 feet. It deepened its shaft at the D-Norrie mine, Gogebic range, and sank a shaft at the Riverton mine, Menominee range.

November Foreign Trade Is Down

Total for 11 Months Retains Lead Over 1928—Scrap Imports Drop Sharply—More Plates and Rails Exported

ALTHOUGH both the export and import trade of the United States in iron and steel products suffered a mild reduction in November from October, the total for the 11 months shows a substantial gain over the same period of last year, according to the iron and steel division, department of commerce. Totals for exports and imports to date are 2,817,110 and 731,433 compared with 2,639,876 and 712,592 respectively for the same time in 1928.

IMPORTS AND EXPORTS
Gross Tons

	—1929—		—1928—	
	Imports	Exports	Imports	Exports
Jan.	54,793	274,296	58,635	205,766
Feb.	58,146	259,711	48,756	185,907
March	52,622	270,925	74,128	221,935
April	54,337	277,580	71,579	215,184
May	74,272	261,516	72,106	267,890
June	63,635	247,811	65,819	262,052
July	71,378	270,532	47,830	253,336
Aug.	83,969	242,856	69,914	284,297
Sept.	60,974	222,408	57,782	228,056
Oct.	63,226	247,646	63,880	256,870
Nov.	54,041	241,829	67,103	256,886
11 mos.	731,433	2,817,110	712,592	2,639,876
Dec.	.....	.....	55,199	221,810
Total	.....	.....	782,694	2,862,997

IMPORTS OF IRON AND STEEL PRODUCTS
(In gross tons)

Item	Nov. 1929	Oct. 1929	January through Nov. 1929	January through Nov. 1928
Pig iron	12,702	14,295	130,591	129,819
Ferromanganese and alloys (1)	4,654	5,944	59,416	43,893
Ferrosilicon (2)	552	1,115	8,973	3,510
Ferrochrome (3)	20	55	597	659
Scrap	6,843	11,056	88,705	56,766
Steel ingots, blooms, billets, etc.	944	2,944	24,789	20,223
Steel bars	3,445	3,017	35,414	82,124
Iron bars	57	110	2,613	2,335
Wire rods	1,364	642	14,614	14,970
Hoops, bands, and scrolls	2,513	3,732	40,498	50,140
Boiler and other plate	133	77	3,243	7,918
Sheets, skelp and sawplate	1,652	1,917	22,678	21,510
Tin plate	10	20	267	871
Structural shapes	11,961	9,378	139,913	153,661
Rails and splice bars	321	164	6,387	14,491
Cast iron pipe	1,140	3,427	49,099	57,265
Other pipe and tubes	3,767	3,150	37,501	41,091
Barbed wire	519	450	5,455	4,804
Round iron and steel wire	320	400	5,349	4,259
Steel telegraph and telephone wire	7	5	26	173
Flat wire and strip steel	171	187	2,021	2,307
Wire rope and strand	169	379	2,327	1,519
Other wire	30	3	435	684
Nails, tacks and staples	591	609	8,390	9,337
Bolts, nuts, rivets and washers	47	34	355	227
Castings and forgings	109	116	1,777	2,754
Total	54,041	63,226	691,433	727,310

(1) Manganese content. (2) Silicon content. (3) Chromium content.

ORIGIN OF PIG IRON IMPORTS
Gross tons

	November	October
Belgium	100	.....
Netherlands	500	207
Norway	205	1,027
Sweden	1,553	281
United Kingdom	3,235	65
Canada	56	3,809
British India	7,053	8,846
Total	12,702	14,295

ORIGIN OF IRON ORE IMPORTS
Gross tons

	November	October
Sweden	13,554	35,914
Spain	.....	4,626
United Kingdom	.....	98
Canada	40	40
Cuba	58,000	46,000
Chile	160,792	153,283
Algeria and Tunis	8,750	.....
Newfoundland	21,540	10,860
Brazil	6,200	6,500
Australia	.....	4,508
Total	268,876	270,279

ORIGIN OF MANGANESE IMPORTS
Gross tons

From	November	October
Germany	536	.....
Soviet Russia in Europe	12,430	7,009
United Kingdom	13	.....
Canada	57	49
Brazil	3,264	12,889
British India	2,080	2,080
Gold Coast	5,218	2,800
Total	23,598	24,827

ORIGIN OF FERROMANGANESE IMPORTS
Gross tons

	November	October
France	109	42
Italy	353	195
Norway	1,198	3,042
United Kingdom	1,340	597
Canada	1,654	2,068
Total	4,654	5,944

ORIGIN OF IMPORTS
Gross tons

	Ingots blooms, etc.	Steel scrap	Cast iron pipe	Steel bars
Belgium	527	123	34	1,156
France	299	.....	1,106	250
United Kingdom	4	6	.....	164
Canada	1	6,195	.....	81
Germany	86	.....	.....	487
Sweden	27	.....	.....	1,247
Italy	.....	248	.....	.....
Netherlands	.....	.....	.....	.....
Japan	.....	2	.....	.....
Cuba	.....	228	.....	.....
Panama	.....	41	.....	.....
Czechoslovakia	.....	.....	.....	50
Norway	.....	.....	.....	5
Denmark	.....	.....	.....	5
Total	944	6,843	1,140	3,445

EXPORTS OF IRON AND STEEL PRODUCTS
(In gross tons)

Item	Nov. 1929	Oct. 1929	January through Nov. 1929	January through Nov. 1928
Pig iron, not including ferro-alloys	678	1,432	44,734	76,268
Ferromanganese and spiegeleisen	103	33	1,491	7,858
Scrap	55,565	47,936	495,899	479,831
Ingots, blooms, etc.	10,917	1,733	44,794	28,475
Skelp	17,499	16,971	129,339	127,868
Iron bars	397	225	3,853	5,042
Steel bars	9,940	13,077	181,755	143,538
Alloy steel bars	744	832	14,367	13,372
Wire rods	2,518	2,578	39,194	35,787
Plates	16,698	11,929	182,390	147,533
Galvanized sheets	7,701	9,390	142,455	138,521
Black steel sheets	10,352	12,331	161,417	166,520
Black iron sheets	1,337	1,363	14,750	14,835
Hoops, bands, and strip steel	4,634	4,026	65,546	52,468
Tin plate, terneplate, etc.	16,781	23,389	234,443	232,335
Structural shapes, plain material	25,465	30,513	258,255	185,718
Structural shapes, fabricated	10,973	7,534	106,387	83,209
Metal lath	248	409	4,973	4,939
Steel rails	12,342	8,297	139,200	178,791
Rail fastenings, switches, frogs, etc.	2,425	2,531	29,660	38,755
Boiler tubes	1,474	1,630	17,555	17,357
Casing and oil line pipe	4,265	9,932	110,042	111,914
Black and galvanized welded pipe	9,448	12,568	130,659	103,239
Malleable iron screwed pipe fittings	838	1,466	11,282	9,075
Cast iron screwed pipe fittings	589	1,917	12,871	6,641
Cast iron pressure pipe and fittings	2,323	1,718	12,893	9,018
Cast iron soil pipe and fittings	1,812	4,120	16,387	15,507
Plain wire	2,814	3,471	42,354	43,596
Barbed wire and woven wire fencing	3,461	5,673	60,066	68,964
Wire cloth and screening	123	115	1,579	1,681
Wire rope	316	597	6,584	4,757
Insulated wire and cable	159	51	1,012	595
Other wire and manufactures of	517	619	9,772	9,112
Wire nails	604	721	12,081	13,540
Nails, other than wire	903	525	8,995	8,345
Tacks	42	52	619	668
Horseshoes	56	88	431	420
Bolts, nuts, rivets, except track	1,058	1,267	14,756	12,421
Car wheels and axles	1,606	2,211	20,283	14,570
Iron castings	747	528	10,279	10,366
Steel castings	646	871	10,321	8,581
Forgings	711	977	11,387	10,883
Total	241,829	247,646	2,817,110	2,642,912

DESTINATION OF IRON, STEEL EXPORTS
(In gross tons)

Country of destination	Nov. 1929	Oct. 1929	Jan. thru Nov. 1929	Jan. thru Nov. 1928
N. & Cent. America & W. Indies	120,979	121,517	1,421,253	1,313,080
Canada & Newfoundland	102,936	97,309	1,169,066	1,093,422
Cuba	5,027	6,101	63,714	60,078
Guatemala	580	816	7,089	7,683
Honduras	444	683	9,147	6,415
Mexico	7,090	11,484	96,445	75,861
Panama	1,481	1,095	18,308	15,725
Salvador	363	708	6,525	3,070
British W. Indies	684	1,114	16,806	7,282
Other W. Indies	1,349	1,209	24,810	35,627
Other Cent. America	1,025	998	9,343	8,019
S. America	30,724	34,405	362,718	404,706
Argentina	4,526	8,378	84,408	91,817
Brazil	4,870	7,979	65,504	78,483
Chile	14,296	5,515	64,020	65,746
Colombia	1,507	3,409	38,288	60,757
Peru	1,503	1,982	33,440	24,494

Uruguay	175	2,445	9,180	8,338
Venezuela ..	3,209	4,197	62,330	70,763
Other S. America..	638	500	5,548	4,420
Europe	21,443	19,371	336,033	262,576
Belgium	41	108	2,469	13,312
France	529	1,118	17,476	5,948
Germany	899	2,992	21,997	22,493
Italy	6,182	3,453	103,107	86,206
Netherlands	91	264	2,763	2,121
Poland and Danzig ..	7	10	75,098	56,905
Rumania ..	241	119	3,779	4,170
Soviet Russia in Europe	2,523	912	11,070	2,750
United Kingdom	5,224	5,704	62,726	49,805
Other Europe	5,706	4,691	35,548	18,866
Far East	66,211	65,714	670,877	650,262
British Malaya ..	576	955	9,081	6,229
China	3,559	3,588	64,217	88,063
Netherlands E. Indies	2,669	3,359	57,388	37,564
India and Ceylon	3,543	1,568	20,124	24,668
Japan	42,550	43,100	373,417	374,289
Kwantung..	1,628	294	11,204	13,840
Philippine Islands	7,023	8,937	92,868	77,291
Australia ..	1,844	1,557	20,814	15,225
New Zealand ..	471	907	5,069	2,002
Other Asia & Far E. markets ..	2,348	1,449	16,695	11,091
Africa	2,472	6,639	26,229	12,277
Union of S. Africa	385	655	7,800	5,755
Egypt	1,579	5,724	13,591	3,669
Mozambique	72	128	2,856	1,165
Other Africa	436	132	1,982	1,688

Profits Up to Average

Chicago, Dec. 31.—Net profit of the American Steel Foundries for 1929 should approximate the average reported for the past six years, which was $4,843,447 after depreciation and federal taxes, it is stated. The company goes into 1930 with prospects of a satisfactory volume of business for at least the first half although unfilled tonnage at the end of 1929 was smaller than that carried over from 1928.

Gardner Machine Co., South Beloit, Ill., has changed its capital from $750,000 to 82,300 shares of no par value.

1929 Sets Another Record in Total of Industrial Building

REPEATING the record of 1928 in industrial building, the first 11 months of 1929 exceeded all of 1928 in number of building projects awarded and the total cost involved. In 1928 a total of 4940 industrial projects was awarded, involving a cost of $506,083,500 while Jan. 1 to Dec. 1 in 1929 gave a total of 5193 projects with a total cost of $525,730,200.

These totals bring the year just closed in line with the upward trend of industrial building during the present decade. Only in 1919 and 1920 were totals reached which exceeded the figures of the past two years. In 1928 a new record was made and in 1929 the same condition was present. Addition of December activities doubtless will carry the past year well ahead of its predecessor and set a new mark for the decade.

The average cost involved in each project in 1929 holds closely to the same figure in the preceding year, indicating that in a cross section of industry the growth has been steady, though this will not hold true for the various divisions.

The metalworking field, during 1929, recorded 1035 projects, compared with 1125 in 1928. This loss in number is more than made up by the cost, which was $115 730,200 in 1929, compared with $109,715,800 in 1928. This indicates an increase of about 50 per cent in the cost of the average project over the preceding year.

Activity of the oil industry, which has been a matter of observation throughout 1929, is proved by the statistics of that industry. While in 1928 only 36 projects, involving $9,305,000, were recorded in 1929 the number rose to 132 and the cost to $52,878,000. This industry is a large consumer of iron and steel products and the activity reflected in these figures has contributed much to the tonnage of mills in various lines of steel production.

Central heat and power stations prove rather a disappointment. Though the number of projects was slightly larger than in 1928 their total cost was considerably less, indicating a smaller average cost. The projects numbered 227 in 1929 against 222 in 1928 and the cost was $87,869,900 in 1929 and $108,294,300 in 1928.

The mining and quarrying industry also was disappointing; another patron of iron and steel manufacturers which failed to equal its record of the preceding year. The number of projects in this field increased from 274 to 314 but the cost involved declined from $51,433,100 to $26,918,000.

Shrinkage from the estimated cost of projected work to the actual awards was less than in 1928. This difference in total is met each year, due to plans which are not carried out or are reduced because of cost. While the total almost invariably shrinks between original plan and actual construction, the same thing is not true of an individual branch of industry.

In the metalworking field the shrinkage was from 1136 to 1035 projects and the cost from $207,504,000 to $155,730,200. Central heat and power stations lost sufficiently to indicate a large number of deferments or a decided scaling of cost. In this industry projects dwindled from 282 planned to 227 awarded and the cost from $262,077,100 to $87,869,900.

Construction Awarded and Contemplated in 1928 and 1929

Figures for 1929 Include Period Jan. 1 to Dec. 1

	AWARDED				CONTEMPLATED			
	No. of Projects		Cost of Construction		No. of projects		Cost of Construction	
	1929	1928	1929	1928	1929	1928	1929	1928
Metal working	1,035	1,125	$155,730,200	$109,715,800	1,136	1,186	$207,504,000	$151,529,500
Miscellaneous and unspecified	1,591	1,285	86,475,200	59,929,200	1,833	1,471	93,726,500	74,993,300
Food products	865	942	49,072,200	61,916,500	1,044	1,064	49,058,200	59,627,000
Textile, cordage, etc.	261	265	17,038,100	37,601,100	261	340	30,835,300	41,561,200
Rubber working	29	49	2,555,500	2,000,600	38	48	2,970,500	3,367,000
Oil mills, refineries	132	36	52,878,000	9,305,000	164	198	37,330,000	45,736,000
Central heating and power plants	227	222	87,869,900	108,294,300	282	287	262,077,100	298,418,700
Chemicals, paints, etc.	213	239	12,139,400	36,195,600	220	241	24,120,500	18,432,600
Mining, quarrying, etc.	314	274	26,918,000	51,453,100	312	291	49,003,900	48,185,200
Leather working	47	46	2,299,500	1,942,500	44	60	1,545,500	2,427,500
Paper and pulp mills	99	102	13,591,800	11,382,300	101	103	8,579,600	12,532,800
Printing and binding	165	137	13,357,500	10,300,100	186	156	10,708,200	12,870,700
Woodworking	215	227	5,800,600	6,047,400	223	256	5,941,000	8,588,500
TOTAL	5,193	4,940	$525,725,900	$506,083,500	5,844	5,541	$783,400,300	$778,370,000

Data supplied by F. W. Dodge Corp.

Personals

FRANK W. MILLER and J. P. Dovel, vice presidents since May, 1925, of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., resigned, effective Dec. 31. Both have been with the company many years. Mr. Miller prior to 1925 was head of the coke department and Mr. Dovel was general manager of blast furnaces.

H. A. Berg, who since October, 1929, has been assistant to Hugh Morrow, president of the Sloss-Sheffield company, was elected vice president, effective Jan. 1. He has devoted his attention to the operating departments. Prior to the spring of 1929, Mr. Berg was vice president of Arthur G. McKee & Co., Cleveland, having been with that interest for five years.

* * *

Frederick P. Palen has resigned as vice president of Newport News Shipbuilding & Dry Dock Co., Newport News, Va., after a 35-year affiliation.

* * *

J. B. Henry has resigned as vice president and director of the Union Steel Casting Co., Pittsburgh, after being connected with it since 1911, serving as vice president for the past 10 years.

* * *

John M. Davie, 2453 Overlook road, Cleveland Heights, O. has been appointed representative for the General Mfg. Co., Detroit, flexible power presses. His territory comprises western Pennsylvania and northern Ohio, excepting Toledo and suburbs.

* * *

A. H. Doering, representative for the past year in northern Ohio with headquarters at Cleveland, of the Pittsburgh Bridge & Iron Works, has been transferred to Pittsburgh main office, Fulton building, Pittsburgh, as sales manager.

* * *

Walter C. Carroll resigned Dec. 31 as chairman of the Oil Well Supply Co., Pittsburgh. He was elected president of that company in December, 1927, and later became chairman. He previously had been president of the National Association of Sheet and Tin Plate Manufacturers, Pittsburgh, and from 1921 to July, 1927, was vice president of the Inland Steel Co., Chicago.

* * *

John C. Allen, chief mechanical engineer, New Castle, Pa., works, Carnegie Steel Co., Pittsburgh, has been appointed assistant general superintendent to succeed the late John C. Taggart.

* * *

L. R. Nourie, Park building, Pittsburgh, has been appointed district engineer in northern West Virginia, eastern Ohio, Western Pennsylvania and Alleghany and Garrett counties in Maryland for the Despatch Oven Co., Minneapolis, manufacturer of all varieties of industrial ovens.

* * *

G. Douglas Morse, 24 Milk street, Boston, is now New England representative of the Westcott Chuck Co., Oneida, N. Y.

P. R. Paulsen has been appointed New York representative, managing the office recently opened at 25 Church street.

Obituaries

THEODORE A. Martin, superintendent of Farrell-Cheek Steel Foundry Co., Sandusky, O., since late 1922, died Dec. 25 from apoplexy. Prior to March, 1920, he had been identified with the George H. Smith Steel Casting Co., Milwaukee, had installed a new steel foundry for the Erie Forge Co., Erie, Pa., in 1920, and early in 1922 returned to Milwaukee as manager of the Maynard Electric Steel Casting Co.

* * *

Edward O. Wells, 65, retired president of the Roane Iron Co., Chattanooga, Tenn., died recently. He was born in Bedford, O., but had been a dominant figure in southern iron and steel for 35 years.

* * *

William Paton Thomson, 57, New York, former vice president of the Rail Joint Co., that city, died in an Atlantic City, N. J., hospital Dec. 21. He was a noted civil engineer and since 1906 devoted his time mostly to railroad track problems.

* * *

Arthur J. Larmon, 44, president and treasurer of the Rahn-Larmon Co., Cincinnati, manufacturer of machine tools, died recently after an illness of almost a year. His father was James A. Larmon, a pioneer in the barbed wire fence industry in Cincinnati. He joined the firm after graduation from Kenyon college in 1906 and was made president nine years ago.

* * *

W. J. Sampson, philanthropist and former official of the Republic Iron & Steel Co., Youngstown, O., died Dec. 25 at the home of his son, W. J. Sampson Jr., Shaker Heights, O., who is vice president of Steel & Tubes Inc.

* * *

Employment and Wages Hold to High Levels

(*Concluded from Page* 46)

mills working under arrangements with the Amalgamated also tended upward in 1929. They now are 27 per cent above base, compared with 25.5 per cent a year ago. Average hourly earnings in sheet mills in 1929 were 79.3 cents, and in tin plate mills 73.2 cents. These figures represent an advance of 3.4 cents for sheet workers in sheet mills, and of 2.8 cents an hour for those in tin plate mills, over 1926.

Wages of union molders were advanced in three of 11 major districts beginning Jan. 1, 1930. Cleveland with a rate of $7.60 for eight hours, St. Louis with $7.50, and Boston with $7.20 moved up to $8 for eight hours. Cincinnati probably will advance from $7.50 to $8 in the spring. In the New York city district union molders were receiving $8.50 for eight hours, but a recent change gives molders in bronze foundries $51 for a 44-hour week, equivalent to $9.28 for eight hours, while iron and machinery brass molders now receive $8 for eight hours. Bronze molders are affiliated with the building trades unions, hence receiving the building trades wage scale.

The general average for union iron molders in 11 districts is equivalent to 94.1 cents an hour, the highest since the war, and compared with 92.7 cents a year ago, and 43 cents in 1914.

Hourly rates paid common labor by subsidiaries of the United States Steel Corp. have not been changed since 1923. In April of that year the rate was raised from 36 cents to 40 cents, and in August, 1923, when the 12-hour day was abolished the rate for 10-hour workers became 44 cents, and for 8-hour men 50 cents.

The entrance wage rates of common labor in 1929 for 155,000 employes in 13 industries averaged 43.7 cents an hour. The highest was 49.9 cents paid in the automobile industry, and the lowest 32 cents, in the sawmill industry.

Open-Hearth Pouring Floor, Fordson Plant, Ford Motor Co.

Domestic Market Reviews for 1929

Pig Iron
Coke
Semifinished Steel
Tin Plate
Cast Iron Pipe
Merchant Bars
Welded Pipe
Wire Products
Warehouse
Refractories
Ferroalloys
Structural Shapes
Rails
Sheets
Plates
Nonferrous Metals
Old Material
Coal By-Products
Strip
Canadian Markets

Prepared by Iron Trade Review Staff Representatives

E. C. Kreutzberg, New York
F. B. Pletcher, Chicago
W. G. Gude, Pittsburgh
B. K. Price, New York
W. J. Nolle, New York
L. E. Browne, New York
F. S. Tobin, Toronto

Only Good Start Gives Iron, Steel Production Records to 1929

New Highs Made Possible by First Five Months—Prices Follow Output Closely—Patents Recognized—East Buys Coast Plants

By E. C. Barringer

NINETEEN TWENTY-NINE suffered eight months of declining steel ingot production and seven of pig iron. It was shaken by the severest stock market collapse in history. Beginning with June, each succeeding month developed a recession in the daily rate of both pig iron and steel ingots, which in November and December fell to the lowest level in five years.

Yet 1929 overcame these handicaps, which would have put the stamp of mediocrity on any less virile year, and by the grace of the impressive lead accumulated in the opening five months withstood the attrition of the closing seven and emerged the greatest production year.

Peak Output Mirrors Record Demand

With December estimated, the 1929 output of pig iron was 42,400,000 gross tons, handily exceeding the 37,831,741 tons of 1928 and narrowly topping the record 40,025,850 tons of 1923. Open-hearth and bessemer ingots, at 54,139,000 gross tons, mowed down the previous high, the 49,865,185 tons of 1928.

The richly-merited 1929 record reflected directly an expansion of requirements in all major consuming lines. At all times production was in consonance with consumption, and in the late spring and early summer the industry was taxed to make deliveries. As consumption slowly ebbed through the summer and fall, iron and steelmaking capacity was gradually dropped, and in the final sixty days of the year drastic reduction became imperative.

The race for leadership in consumption of steel remained close in 1929 as in 1928, when the automotive industry barely nosed out the railroads. In 1929 the automotive industry assembled 5,400,000 units, about 1,000,000 more than the record of 1928. The railroads, meanwhile, bought about 106,000 freight cars, compared with 44,763 in 1928, and 900 locomotives, against 600 in 1928. Partly due to federal aid, ocean shipyards last year were the busiest since the war.

Building in which steel was the principal material remained fairly steady all year, as did the manufacture of farm implements and tractors. More long-distance pipe lines, for which electrically-welded pipe was specified, were placed in 1929 than in any previous year. The favorable balance in foreign trade was improved as exports, higher than in 1928, increased faster than imports.

Price Trend Shows Only Minor Fluctuations

Fluctuations in price, excepting scrap and southern iron, were minor in 1929, and as may be seen from the accompanying graph, the trend of prices and production was uniquely parallel. In general, prices rose mildly in the opening five months and

How 1929 Compared Statistically with 1928

In Production

	*1929	1928
Coke Pig Iron (gross tons)	42,400,000	37,831,741
Steel Ingots (gross tons)	54,139,000	49,865,185
Coke (net tons)	57,700,000	52,581,577
Autos and Trucks (U.S.)	5,400,000	4,358,759
Freight Cars Ordered (U.S.)	106,000	44,763

*December estimated.

***In Price**

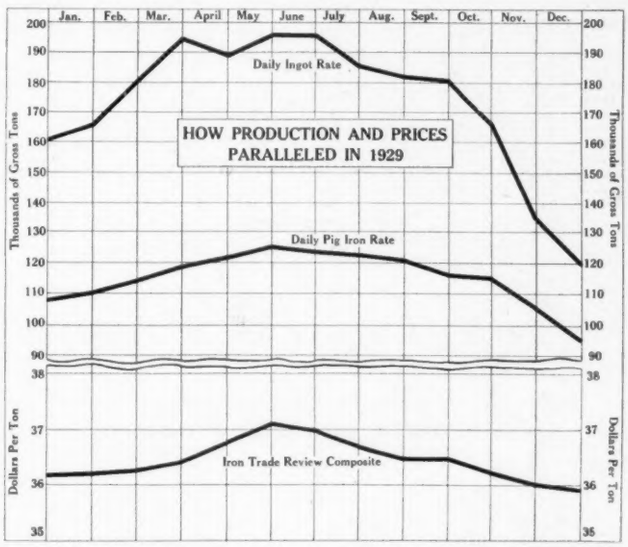
	1929	1928
10 Pig Iron	$18.85	$18.15
2 Semifinished Steel	$34.85	$33.40
6 Heavy Finished Steel	2.00c	1.96c
6 Steel Sheet	2.99c	2.89c
6 Scrap	$16.22	$14.35

*Average prices on typical grades in representative markets.

declined as gently in the final seven. Having imposed no sharp advances when demand was strong, producers had no excesses to liquidate when demand ebbed.

A major development in the price situation, making for stabilization, was the growing recognition of patents. This tendency received great impetus from the expanding market for heat and corrosion resistant alloys; it may be said that every such alloy is patented and manufactured under license. Subsidiaries of the United States Steel Corp. are now licensed by the Bethlehem Steel Corp. to roll wide-flange structural sections, and by the American Rolling Mill Co. to roll continuous flat steel. Other licensees of the American company include the Republic Iron & Steel Co., Weirton Steel Co., Wheeling Steel Corp., Gulf States Steel Co., Otis Steel Co. and Youngstown Sheet & Tube Co.

Considerable revision was made last year in the competitive situation. In the aggregate more material was shipped on the Great Lakes and on inland waterways than in 1928, with indications a larger percentage of production will be so moved in 1930. Shipment of finished material from Lake Erie ports to North Atlantic destinations is in prospect. When production at Chicago was inadequate in midsummer, semifinished material was brought in from Alabama and Ohio; an expansion program now under way at Chicago will make up the deficiency in production. Southern iron was freely offered at Atlantic ports and as far north as Michigan at competitive prices.



Record Year, Also, For Mergers

When the United States Steel Corp. purchased the Columbia Steel Corp. properties on the Pacific coast the Bethlehem Steel Corp. promptly adjusted the balance by acquiring the Pacific Coast Steel Co. and Southern California Iron & Steel Co., making eastern producers dominant in west coast production. The purchase of the Interstate Iron & Steel Co. by the Central Alloy Steel Corp. and of the Donner Steel Co. and Witherow Steel Corp. by the Otis-Eaton-Mather interests of Cleveland was the forerunner of the long-discussed middle western independent merger linking such important steel producers as the Youngstown Sheet & Tube Co., Republic Iron & Steel Co., Central Alloy Steel Corp. and the Inland Steel Co.

Exports of iron and steel in 1929, with final months estimated, totaled about 3,000,000 tons, compared with 2,862,997 tons in 1928, while imports approximated the 782,694 tons of 1928.

Business is Unmindful of Congress

Of numerous extraneous occurrences, the stock market break was pre-eminent. It came after five consecutive months of decline in iron and steel production and accelerated, not initiated, the adjustment from record levels. Congress was in session practically all year, at the behest of the new engineer President, Herbert Hoover, but there was no visible effect upon business. Discussion of duties on manganese ore and pig iron was acrimonious, but unproductive. Extraordinary faithfulness to production was recorded by IRON TRADE REVIEW composite of 14 leading iron and steel products. This index started the year at $36.25, rose with production to a peak of $37.13 in May, then sank gradually over the rest of the year to slightly under $36 at the close. A year ago it was aptly said here that "few years are swept in on so high a crest as 1929 has been" and "industrial leaders cannot detect any curtailment of the buying power which has carried American business to new heights." As much cannot be said for 1930. The immediate reaction to the stock market debacle has been weathered, but there are reservations whether 1930 will maintain the pace of 1928 and 1929.

But the iron and steel industry is irrevocably committed to a first quarter bettering the preceding fourth quarter, and 1930 promises to conform. The customary heavy backlog of railroad track material already is on mill books. No small portion of the largest railroad equipment orders since 1924 remains to be worked off. The Ford program of 2,500,000 cars in 1930 alone assures better demand from the automotive industry. Important public works are maturing.

Without regret the iron and steel industry has emerged from the disappointing fourth quarter to a period certain to bring some improvement. Though the general expectation is for a "normal" year and a moderately easier situation than in 1929, the horizon is unusually blurred where the second quarter succeeds the first.

Domestic Iron and Steel Prices in 1929

Average Monthly Prices of Leading Materials at Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Bessemer	$19.96	$19.86	$20.11	$20.26	$20.56	$20.76	$20.76	$20.76	$20.76	$20.76	$20.76	$20.76
Basic	19.26	19.26	19.36	19.76	20.06	19.63	19.63	19.63	19.63	19.63	19.63	19.63
Foundry No. 2	19.36	19.26	19.51	19.86	20.16	19.76	19.76	19.76	19.76	19.76	19.76	19.76
Malleable	19.76	19.76	19.86	20.26	20.56	20.13	20.13	20.13	20.13	20.13	20.13	20.13
Gray Forge	18.76	18.76	19.11	19.36	19.63	19.13	19.13	19.13	19.13	19.13	19.13	19.13
Bessemer Ferrosilicon, 10 per cent	31.00	31.00	31.00	31.00	31.00	31.00	31.00	30.20	30.00	30.00	30.00	30.00
SEMIFINISHED												
Billets, Bessemer	$33.00	$34.25	$34.00	$34.50	$36.00	$35.75	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00
Billets, Open Hearth	33.00	34.25	34.00	34.50	36.00	35.75	35.00	35.00	35.00	35.00	35.00	35.00
Sheet Bars, Bessemer	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	35.00
Sheet Bars, Open Hearth	34.00	33.25	35.00	35.25	36.00	35.75	35.00	35.00	35.00	35.00	35.00	35.00
Wire Rods	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	40.00	40.00	40.00
COKE												
Furnace, Spot	$2.75	$2.90	$2.95	$2.75	$2.75	$2.75	$2.75	$2.75	$2.65	$2.65	$2.65	$2.65
Foundry, Spot	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.55	3.50
ROLLED PRODUCTS												
Structural Shapes	1.90c	1.90c	1.90c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.90c	1.90c
Plates, base	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90
Steel Bars, base	1.90	1.90	1.90	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.90
Cold Finished Steel Bars	2.20	2.20	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.20	2.20
Strip, Hot Rolled—												
To 6 inches wide	1.90	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
6 1/16 to 24 inches	1.80	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
Strip, Cold Rolled, base	2.85	2.85	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Steel Pipe, 1 to 3-in. discount	.62	.62	.62	.62	.62	.62	.62	.62	.62	.62	.62	.62
Standard Spikes, base	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Wire Nails, base	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.50	2.45	2.40	2.40
Plain Wire, base	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40
Structural Rivets, base	2.85	2.90	2.95	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
No. 24 Black Sheets	2.85	2.85	2.85	2.90	2.95	2.95	2.85	2.85	2.85	2.80	2.75	2.75
No. 10 Blue Annealed Plates	2.10	2.10	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.15	2.10	2.20
No. 13 Blue Annealed Sheets	....	....	....	....	....	2.35	2.35	2.35	2.35	2.35	2.35	2.35
No. 24 Galvanized	3.60	3.60	3.60	3.65	3.70	3.65	3.60	3.55	3.50	3.50	3.45	3.45
Tin Plate, base box	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35
OLD MATERIAL												
Heavy Melting Steel	$19.00	$18.60	$18.50	$18.60	$17.85	$18.30	$18.45	$18.90	$18.45	$17.30	$16.30	$15.00
Low Phosphorus	22.00	22.50	22.35	23.25	22.40	22.25	22.50	22.80	23.00	22.20	21.75	20.75
No. 1 Cast	15.30	14.50	15.20	15.45	15.00	15.00	15.00	15.00	15.00	15.00	14.90	14.75

Average Monthly Prices of Leading Materials at Chicago

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lake Superior Charcoal	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04
Northern No. 2 Foundry	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Southern No. 2 Foundry	22.51	22.51	21.51	21.51	21.51	21.25	20.01	20.01	18.90	19.01	19.01	19.01
Malleable	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Bar Iron	2.00c	2.05c	2.00c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.00c	2.00c
Rail Steel Bars	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.90
Soft Steel Bars	2.00	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	2.00
Structural Shapes	2.00	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	2.00
Plates	2.00	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.00	2.00
No. 24 Black Sheets	3.00	3.00	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.05	2.95	2.90
Heavy Melting Steel	$16.50	$16.00	$15.55	$15.95	$15.45	$14.95	$14.75	$15.05	$15.05	$14.45	$13.05	$12.50
No. 1 Railroad Wrought	14.75	15.75	16.00	16.65	16.40	15.40	14.85	15.40	15.70	14.85	13.85	13.25
Rails for Rolling	17.10	17.50	17.50	17.50	17.50	17.50	17.50	17.75	17.60	17.05	15.30	14.60
Car Wheels, iron	14.10	14.50	14.50	14.75	14.50	14.20	13.60	14.00	14.00	14.00	13.60	13.65
No. 1 Cast (machinery)	17.65	17.90	17.90	17.90	17.25	16.25	16.25	16.25	16.80	15.65	15.35	15.10

Average Monthly Prices of Leading Materials in the East

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Basic, Eastern Pennsylvania	$20.15	$20.50	$20.25	$20.25	$20.50	$20.25	$19.85	$19.85	$19.85	$19.75	$19.75	$19.75
No. 2X Foundry, Philadelphia	22.26	22.01	22.26	22.26	22.76	22.76	22.26	22.26	22.26	22.26	22.26	22.01
No. 2X Virginia, furnace	21.25	21.25	21.00	20.75	20.75	20.00	20.00	20.00	20.00	19.65	18.25	18.25
Standard Low Phosphorus, Phila	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.76	24.76	24.76	24.76
ROLLED PRODUCTS												
Tank Plates, base, Philadelphia	2.10c	2.10c	2.10c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.10c	2.10c
Structural Shapes, base, Phila	2.06c	2.01c	2.01c	2.06c	2.06c	2.06c	2.06c	2.06c	2.06c	2.01c	1.95c	1.91c
Steel Bars, Base, Philadelphia	2.27c	2.27c	2.27c	2.27c	2.27c	2.27c	2.27c	2.27c	2.27c	2.22c	2.22c	2.22c
Bar Iron, common, base, Phila	2.22c	2.22c	2.22c	2.17c	2.17c	2.17c	2.17c	2.17c	2.17c	2.17c	2.17c	2.17c
No. 10 Blue Annealed, Phila	2.42c	2.42c	2.42c	2.52c	2.52c	2.52c	2.52c	2.52c	2.52c	2.52c	2.47c	2.47c
Billets, Open Hearth, Philadelphia	$38.30	$38.30	$39.30	$39.30	$39.30	$39.30	$40.30	$40.30	$40.30	$40.30	$40.30	$40.30
OLD MATERIAL												
†No. 1 Heavy Melting Steel	$16.50	$16.30	$16.25	$17.00	$16.25	$16.25	$16.50	$16.75	$16.375	$15.80	$15.125	$14.50
†No. 1 Railroad Wrought	15.50	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.13	16.00	16.25	15.25
†No. 1 Cupola Cast	16.75	16.75	16.50	16.50	16.50	16.50	16.50	16.50	16.25	16.25	16.00	16.00

†These prices apply to delivery at Eastern Pennsylvania consuming points other than Bethlehem.

Steady, Gainful Year in Pig Iron

Stable Demand, Higher Prices and Lack of Fluctuations Improve Furnace Position—Price Cutting Avoided by Balancing Output to Requirements

HEAVIER demand, average price increases of more than $1 a ton, and unusual stability in quotations marked improved conditions in the merchant pig iron industry during 1929, compared with the preceding year. Competition between merchant and steelworks furnaces was restricted in a measure during most of the 12 months by the heavy requirements of open-hearth furnaces, but there was less pressure than formerly against prices during the fourth quarter when this bulge in demand had passed.

Quotations lacked the fluctuations common during midsummer, exhibiting a steadiness that had not been approached since 1918, when government regulation was in effect. Valley prices of basic, bessemer and No. 2 foundry iron reached the year's peaks in May and maintained these levels through the year. In all cases the average prices were higher than in 1928. Bessemer iron, with an average figure of $18.49, valley, for the first 11 months, based on monthly compilations of W. P. Snyder & Co., Pittsburgh, showed an increase of $1.05 a ton over the 1928 average of $17.44. Basic iron increased from $16.68 in 1928 to $18.19 during the past year, while No. 2 foundry rose from an average of $17.13 to $18.22.

That pig iron prices have recovered only mildly from the steady downward trend of recent years, however, is indicated by the fact that, with the exception of 1928, the 1929 average on bessemer was the lowest since 1915, and the average prices of both basic and No. 2 foundry, with the exception of 1927 and 1928, also were the lowest in 14 years.

Merchant furnaces shared substantially in the total increase in pig iron production during 1929, showing a slightly larger percentage gain than did nonmerchant interests, compared with 1928 figures. Increases for the first 11 months were 20 per cent and 17 per cent, respectively. An important change in the lineup of merchant furnaces in the Pittsburgh and valley districts occurred in April when the Davison Coke & Iron Co. acquired long-term leases of the Leetonia, O., stack of the Hanna Furnace Co. and the Claire furnace of the Reliance Coke & Iron Co. at Sharpsville, Pa. This reduced the number of merchant interests to three, the other two being the Struthers Iron & Steel Co., which blew in its furnace at Struthers, O. early last year, and the Shenango Furnace Co. with two stacks at Sharpsville. The Davison company commenced operations the middle of the year at its new plant on Neville Island. This stack became the only merchant furnace in the immediate Pittsburgh district.

A further departure from regular coverage on forward requirements of consumers was noted during the year. The fact that prices were stable over such a long period during 1929 partly was responsible for melters entering the market for smaller individual tonnages on more frequent occasions, and late in the year the additional influence of a decline in consumption caused hand-to-mouth buying to become pronounced.

Despite the substantial drop in new buying during fourth quarter, pig iron producers managed to effect a fairly close relationship between supply and demand, furnaces being blown out or banked, and there was a lack of the former tendency to force business through cut prices. The year closed with buying at a low ebb.

Further economies in merchant furnace production were accomplished in the Chicago district. This market also was featured by unusual steadiness in price, the $20 Chicago district furnace quotation for the base northern grades holding throughout the year, except for occasional concessions in western Michigan and northern and central Indiana to meet the usual competitive conditions in those consuming centers.

Preliminary estimates of the year's shipments from Chicago district furnaces indicated early in December only a slight falling off from the record year 1926, and a possible slight gain over 1928, despite the declines in November and December. As automotive production, directly or indirectly, claims nearly 50 per cent of the merchant output in the Chicago area, the slump in that industry affected materially the western malleable consumption late in the year.

Several lots of boat iron shipped from the East and left on docks in the Chicago district were sold at 50 cents to $1 under the market. Twelve cargoes, or 30,000 to 35,000 tons, largely of Buffalo iron, were released to the merchant trade and shipped to the Chicago-Milwaukee area by lake boat during the navigation season, against 20,000 to 25,000 tons from Cleveland and Buffalo in 1928, and about 35,000 tons of Cleveland and Buffalo iron in 1927. August buying

MONTHLY PIG IRON AVERAGES
By W. P. Snyder & Co.

	1929		1928	
	Bess.	Basic	Bess.	Basic
Jan.	$18.25	$17.50	$17.50	$17.00
Feb.	18.25	17.50	17.50	17.00
March	18.39	17.60	17.50	17.00
April	18.50	18.00	17.50	16.70
May	19.00	18.50	17.287	16.25
June	19.00	18.50	17.00	15.43
July	19.00	18.50	17.00	16.00
Aug.	19.00	18.50	17.00	16.00
Sept.	19.00	18.50	17.195	16.50
Oct.	19.00	18.50	17.528	17.28
Nov.	19.00	18.50	18.10	17.50
Dec.	.....	.....	18.25	17.50
1929				
11 mo. av.	18.49	18.19	.....	.....
1928				
12 mo. av.	.....	.....	17.44	16.88

COKE PIG IRON PRODUCTION

Month	In blast last day	Merchant output	Non-merchant output	Total output
Jan.	202	744,448	2,688,580	3,433,028
Feb.	208	665,648	2,552,728	3,218,376
Mar.	213	740,966	2,968,552	3,709,518
Apr.	216	740,311	2,922,856	3,663,167
May	220	772,014	3,126,330	3,898,344
June	220	716,715	2,998,389	3,715,104
July	217	741,622	3,040,889	3,782,511
Aug.	209	682,048	3,064,150	3,746,198
Sept.	204	643,197	2,853,257	3,496,454
Oct.	203	739,060	2,849,086	3,588,146
Nov.	176	742,933	2,445,735	3,188,668
Dec.*	.....	650,000	2,310,000	2,960,000
Total 1929†	.....	8,578,962	33,820,552	42,399,514
Mo. Ave.	.....	714,913	2,818,379	3,533,293
Total 1928	.....	7,288,702	30,543,039	37,831,741
Mo. Ave.	.....	607,391	2,545,253	3,152,645
Total 1927	.....	8,374,333	27,976,571	36,350,904
Mo. Ave.	.....	697,861	2,331,381	3,029,242

*Estimated.
†With December estimated.

of southern iron brought into the Chicago consuming area 20,000 to 25,000 tons, some of which was sold as low as $12, base, Alabama furnace.

Eastern furnaces fared less successfully than did Pittsburgh and Chicago district interests although eastern consumption is estimated to have been the heaviest since 1923. The Virginia producer, which resumed operations in October following an extended idleness, suffered considerably from Birmingham district competition, prices being off more than $2 a ton from levels of a year previous. Eastern Pennsylvania merchant furnaces, whose mortality has been heavy in recent years, were affected by the scarcity of iron ore. Ore that formerly was available at 7 to 9 cents a unit on the Atlantic seaboard was difficult to buy last year at less than 11 to 12 cents. Operating costs, consequently, were high and attempts to adhere to high base prices invited considerable competition from Birmingham, Buffalo and other outside points.

By-Product Coke Widens Lead Over Beehive

BY-PRODUCT coke exerted further dominance over beehive during 1928, mounting to a new high record in production, but unusually heavy operations in the iron and steel industry injected a temporary stimulus in demand for the latter fuel. Beehive coke production increased more than 60 per cent over the 1928 tonnage, but the latter figure was the smallest in 46 years. Lack of a summer letdown in blast furnace operations made necessary the firing of a number of beehive ovens by steelworks interests, resulting in a peak output of 110,000 tons in the Connellsville district during each of the first two weeks of June. With the passing of the bulge in coke requirements for blast furnace use, production declined rapidly in October and dropped below the 1928 level during the last two months, to around 40,000 tons weekly.

Several steel companies were forced to bolster the output of their by-product plants by beehive purchases to accommodate their blast furnaces and in instances to supplant by-product coke sold for domestic use. The blowing in of two additional merchant blast furnaces in the Pittsburgh and valley districts also was productive of increased beehive coke business, although the subsequent operation of new by-product ovens at one of these plants eliminated this business.

Furnace coke showed strength during first quarter, rising from $2.65 in January to $3 the following month. A close adjustment of production to demand was successful in preventing accumulation of surplus fuel and offerings were moderate. Some producers remained out of the spot market, filling only their contracts. Occasional small lots for immediate shipment, consequently, brought premiums as high as $3.25, although $3 generally represented the year's peak in the spot market.

Activity declined during the second quarter with the advent of mild weather and loss of heating coke business, and during the next six to seven months was confined largely to contract shipments. The spot furnace market during that period declined to a low of $2.65, which figure was attained in September.

Beehive foundry coke consumption during the year was fair, restricted, however, by light operations among sanitary ware and radiator producers. Prices were fairly steady, the premium grades commanding up to $4.85. On ordinary fuel $3.75 prevailed during the first ten months, declining in November to $3.50. Increased use of heating coke for domestic purposes was noted, although this improvement was confined largely to by-product fuel.

Despite irregular gray iron foundry operations during most of the year, shipments of by-product foundry coke in the Chicago district reached the highest volume since 1926. The movement during the first nine months gained slightly over that of the 1928 period, but it was indicated that the decline during November and December might wipe out that gain. Chicago district by-product ovens operated virtually at capacity until mid-November. Quotations were unchanged throughout at $8, ovens, and $8.75 for local delivery.

By-product coke prices were steady throughout the year in other sections, holding at $9, delivered Philadelphia; $9 to $9.40, delivered Newark; and $9, ovens, Detroit.

Semifinished Lack Affects Other Products

SEMIFINISHED steel was in a strong and active market during the first eight months of 1929, in contrast to the quiet demand of fourth quarter. Requirements of finishing mills ran considerably ahead of semifinished production over an extended period, although premiums developed in prices were only moderate.

Sheet and strip mill operations were affected by the restricted supply of semifinished material during the first two quarters and most producers of slabs, sheet bars and billets were forced by demands of their own finishing mills to withdraw from the open market to all but regular customers.

An easier situation developed in supplies during September and with the marked decline in demand during fourth quarter all grades became plentiful. The year's record automobile production indirectly was responsible for a large portion of the gain in semifinished production since sheet, strip and bar mills held to high operating rates during most of the first three quarters. Wire rod demand was steady and active for many months, although the scarcity apparent in other semifinished grades was lacking in this material. Axle billets showed increased activity in the Chicago district.

Sheet bars opened the year at $34, Pittsburgh, Youngstown and Cleveland, and rerolling billets and slabs at $33. Chicago prices were $35 for both sheet bars and billets. Late in February prices were advanced $1 to $35 for sheet bars and $34 for billets. In April another price advance moved both grades to a parity at $36. This figure did not find universal application, however, since regular contracts had been signed prior to the increase. Some Chicago consumers paid premiums of $1 to $2 over the then $35 base in order to obtain desired shipments, and quoted prices later were advanced to $37. The market at Pittsburgh gradually settled to $35 by July but sheet bars failed to regain the former price advantage over billets. New buying was light during November and December and occasional price concessions were made on billets and sheet bars, but the tonnage involved was insufficient to establish the market. Chicago prices on

rerolling billets and sheet bars ranged from $35 to $37, with the market declining from a nominal $37 quotation to $36 by mid-November.

Wire rods were steady at $42, Pittsburgh and Cleveland, until October, when weakness in the wire market effected a reduction to $40. Chicago quotations were maintained throughout the year at a $1 differential over the Pittsburgh-Cleveland base.

Some of the lower prices that appeared on billets during the past 12 months were applied to material other than standard. These billets, which represented a fairly high percentage of the total, were rolled from off heats or were not of perfect quality in all respects but at the same time were satisfactory for the specific purpose for which they were bought.

Tin Plate Near Record as Food Packs Soar

TIN plate production was heavy during 1929, approaching if not exceeding the record 1928 tonnage. This was accounted for partly by a sharp increase in the packs of the three staple vegetables. Estimating the packs of corn and tomatoes, the total pack of these two and peas was about 46,500,000 cases, compared with approximately 41,000,000 cases in 1928. The pea pack of 18,530,000 cases, with the exception of that of 1924, was the largest in history. Tomatoes, at about 12,000,000 cases, recovered sharply from the poor year in 1928, while the corn pack of around 16,000,000 cases was exceeded in only two previous years.

Cold weather reduced the western fruit packs, offsetting in a measure the gain in vegetables. General line can requirements of tin plate continued to show a steady growth, with consumption in new fields expanding moderately. Exports were active, showing a fairly substantial gain during the first 11 months over the 1928 period. An increase in the Canadian tariff, effective early in 1930, stimulated tin plate shipments to that country in November and December.

Tin mill operations were high during most of the first three quarters. January schedules averaged about 90 per cent and this was increased during the busy spring months. Production was retarded at times by the scarcity of semifinished steel. The usual fall slump brought output down to around 60 per cent by November, but December witnessed a normal seasonal upturn, aided by some anticipatory specifications. Specifications for January shipment indicated average activity for early 1930, and despite the increase in vegetable packs, canmakers look for no large carryover in canned stocks.

Tin plate price was unchanged through the year at $5.35 per 100-pound base box, Pittsburgh. This figure, announced in November, 1928, was an increase of 10 cents per box over the 1928 price. With the exception of the latter year, the 1929 quotation was the lowest since 1923. Producers reaffirmed $5.35 for 1930.

Wire Gains New Fields; Nails Lose Markets

TRENDS in marketing and output of wire products during 1929 stressed the growing consumptive capacity for manufacturers' and merchants' wire, electrical and spring wire, and the heavily declining field for wire nails.

Tonnage of wire products marketed during the year, according to preliminary estimates available early in December, indicated a gain of probably not more than 1 to 2 per cent over 1928. This mark was achieved despite the November-December slump. In the West, several records were made. March shipments and specifications of manufacturers' and common wire products were the heaviest in about four years. Heavy specifications in March, with brisk activity in manufacturers' wire, increased first quarter to virtually the same volume as in the first quarter of the preceding year. May tonnage also was the best for several years. Nails, however, moved slowly, as the carryover from 1928 was heavy. Despite the sluggish movement of nails, distribution of common wire products in the spring months to rural markets was encouraging to sellers and jobber stocks were kept drained steadily.

Except for nails, wire products marketed during the first half in most territories were in a volume equivalent to or heavier than any peace-time year.

Automotive and farm equipment consumption came more to the forefront of wire market support. Even the marked declines in the final quarter failed to pare down entirely the margin over 1928.

Wire production's prices were irregular and weak. The year opened with basic wire at 2.50c to 2.60c, Pittsburgh-Cleveland, to large jobbers, and $2.65 to $2.75 for wire nails. These advanced prices were not applied generally. A gradual softening in nails resulted in a decline of 25 cents a keg by October, and wire accompanied with a $2 drop. Unfortunately for sellers, prices of nails helped break down other wire products. A movement developed toward eliminating fixed differentials between wire and nails. In the West, concessions were made by jobbers to dealers late in the year directly and through combination orders of wire products and heavy hardware,

While western producers sought to maintain the $1 differential over the Pittsburgh-Cleveland-Ironton base, delivered prices quoted by Ohio river, Indiana and Southwest wire makers virtually eliminated the spread at times.

Heavy Building Programs Help Refractories

REFRACTORY producers enjoyed one of the most active years in history during 1929, sales showing a marked increase over the preceding 12 months. This partly was accounted for by a heavy demand for use in new construction, although considerable repair work to furnaces was necessitated by the extreme pressure experienced by iron and steelmaking facilities during the most of the year.

By-product coke oven installations figured prominently in new construction. The Jones & Laughlin Steel Corp. ordered 81 ovens for its Aliquip-

pa plant, Wisconsin Steel Co. contracted for 45 at South Chicago, Bethlehem Steel Co. scheduled 77 ovens for its Johnstown, Pa., plant and 61 for Sparrows Point, Md. Public utility operations of by-product ovens expanded, with the Providence Gas Co. building 25 ovens and the Rochester Gas & Electric Corp. 37.

Among other new construction projects were the wrought iron producing plant of the A. M. Byers Co. at Ambridge, Pa.; the iron, coke and cement plant of the Davison Coke & Iron Co. at Neville Island, Pittsburgh; and steelworks of the Great Lakes Steel Corp. at Ecorse, Mich. Bethlehem Steel Co. commenced an extensive improvement program at Johnstown, involving blast furnace, open-hearth and heating furnace work. The expansion program of the Illinois Steel Co., just getting under way, will require considerable material.

Operations of refractory brick plants were uniformly heavy during most of the year, declining early in third quarter. Rush orders were fairly numerous, with users maintaining small stocks. Prices generally were steady and unchanged during the 12 months. First quality fire clay brick continued $43 to $46, Pennsylvania, with second quality material $35 to $38, and silica brick $43. In the Chicago districts, prices showed a similar steadiness. Magnesite and chrome brick were $65 and $45, respectively.

Heavy Tubular Tonnage Goes into Pipe Lines

GAS and oil pipe lines again featured the market for tubular material, awards during 1929 being heavier than during the active 1928 period and contributing to a favorable year in total tonnage of all products. This reflected the growing consumption of natural gas, most lines being used for distribution of this fuel from fields to distant points.

Two lines were laid from the Monroe fields in Louisiana, one to St. Louis by the Mississippi River Fuel Corp., involving 145,000 tons, and one to Atlanta by the Southern Natural Gas Co., involving 130,000 tons. Total tonnage involved in the larger lines was about 600,000 tons, approximately half of which was made up of electrically welded pipe.

The past year disclosed a further trend toward use of electricity in welding, the Republic Iron & Steel Co. erecting a plant for the production of electrically-welded pipe, while other companies made experiments in the use and development of this process. Seamless tube production continued to expand at the expense of hot-welded material. The most notable increase in producing facilities for seamless tubing was the start of construction of a $20,000,000 plant by the National Tube Co. at McKeesport, Pa.

Business in merchant steel pipe made a favorable showing despite decrease in residential building from the 1928 activity. Requirements of the oil country held up well, although conservation legislation in some western states restricted drilling and demand for tubular material in a measure late in the year. Seamless casing was active during the busy periods of drilling.

The steel pipe card was unchanged throughout the year, but the extra 2½ per cent discount to consumers on black and galvanized butt-weld pipe was removed early in November. Jobbers continued to receive two supplementary discounts of 5 per cent each. Prices on wrought iron pipe were reduced in January, black being out by from $2 to $6 a ton and galvanized by from $4 to $10 a ton. Reductions in extra strong pipe varied from $4 to $12 a ton on black and $10 to $20 on galvanized. This was the first price decline in wrought iron pipe since January, 1923. Lapwelded steel and standard commercial seamless boiler tubes were advanced $4 a ton in November, through a reduction of two points in card discounts.

Wrought iron pipe enjoyed a steady demand through most of the year.

Changes in Discounts on Steel Pipe

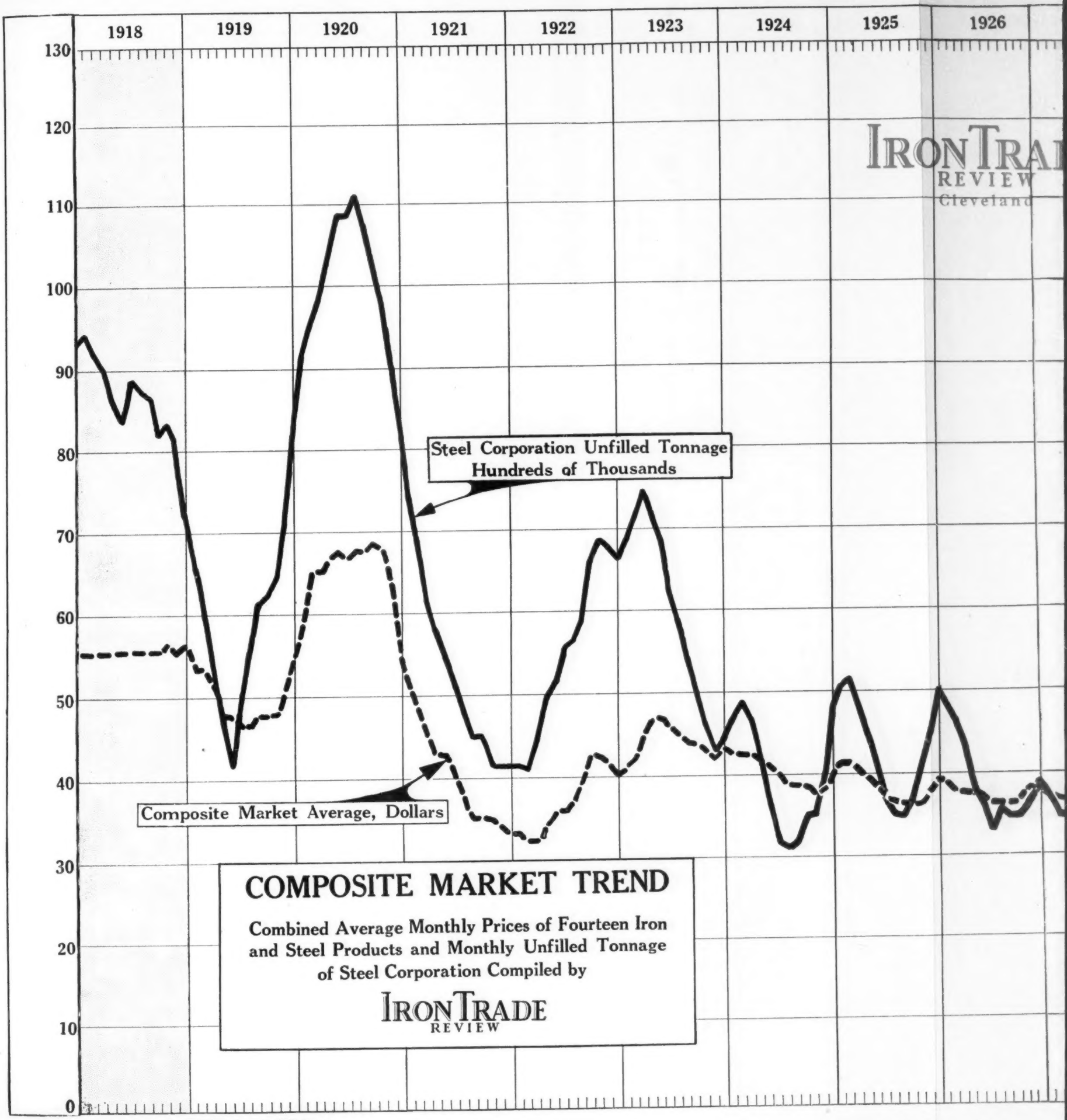
Jobbers, Carloads, Base, Pittsburgh

		Sizes in inches	Butt Weld Basing Black	Butt Weld Discount Galv.
Jan. 1, 1910	to Oct. 1, 1910	½ to 6	78	68
Oct. 1, 1910	to Oct. 2, 1911	2 to 3	80	70
Oct. 2, 1911	to Dec. 1, 1911	2 to 3	81	74
Dec. 1, 1911	to Dec. 15, 1911	2 to 3	83	76
Dec. 15, 1911	to Jan 1, 1912	2 to 3	83	76
Jan. 1, 1912	to July 1, 1912	2 to 3	82	75
July 1, 1912	to July 24, 1912	2 to 3	82	75
July 24, 1912	to Sept. 10, 1912	2 to 3	81	74
Sept. 10, 1912	to Jan. 1, 1913	2 to 3	80	72
Jan. 1, 1913	to April 12, 1913	¾ to 3	80	71½
April 12, 1913	to May 27, 1913	¾ to 3	79½	71
May 27, 1913	to Aug. 8, 1913	¾ to 3	79	70½
Aug. 8, 1913	to Oct. 27, 1913	¾ to 3	80	71½
Oct. 27, 1913	to Feb. 2, 1914	¾ to 3	80	71½
Feb. 2, 1914	to April 20, 1914	¾ to 3	79½	71
April 20, 1914	to Nov. 2, 1914	¾ to 3	80	71½
Nov. 2, 1914	to Feb. 11, 1915	¾ to 3	82	72½
Feb. 11, 1915	to May 1, 1915	¾ to 3	80	69½
May 1, 1915	to June 11, 1915	¾ to 3	79	68½
June 1, 1915	to June 17, 1915	¾ to 3	79	63½
June 17, 1915	to Aug. 5, 1915	¾ to 3	79	57½
Aug. 15, 1915	to Nov. 1, 1915	¾ to 3	79	63½
Nov. 1, 1915	to Jan. 4, 1916	¾ to 3	78	63½
Jan. 4, 1916	to Jan. 20, 1916	¾ to 3	77	62½
Jan. 20, 1916	to Feb. 15, 1916	¾ to 3	76	60½
Feb. 15, 1916	to Feb. 29, 1916	¾ to 3	75	59½
Feb. 29, 1916	to Mar. 15, 1916	¾ to 3	74	57½
Mar. 15, 1916	to Mar. 29, 1916	¾ to 3	73	55½
Mar. 29, 1916	to April 21, 1916	¾ to 3	72	53½
April 21, 1916	to July 24, 1916	¾ to 3	70	50½
July 24, 1916	to Sept. 7, 1916	¾ to 3	70	55½
Sept. 7, 1916	to Nov. 1, 1916	¾ to 3	69	55½
Nov. 1, 1916	to Nov. 15, 1916	¾ to 3	69	55½
Nov. 15, 1916	to Dec. 4, 1916	¾ to 3	68	54½
Dec. 4, 1916	to Dec. 30, 1916	¾ to 3	66	52½
Dec. 30, 1916	to Feb. 14, 1917	¾ to 3	64	56½
Feb. 14, 1917	to Mar. 5, 1917	¾ to 3	62	48½
Mar. 5, 1917	to April 2, 1917	¾ to 3	60	46½
April 2, 1917	to Nov. 6, 1917	¾ to 3	55	41½
Nov. 6, 1917	to Jan. 1, 1919	¾ to 3	51	37½
Jan. 1, 1919	to Mar. 21, 1919	¾ to 3	54	40½
*Mar. 21, 1919	to April 13, 1921	¾ to 3	57½	44
April 13, 1921	to July 7, 1921	1 to 3	62½	50
July 7, 1921	to Sept. 16, 1921	1 to 3	64½	52
Sept. 16, 1921	to Dec. 15, 1921	1 to 3	68½	56
Dec. 15, 1921	to Aug. 17, 1922	1 to 3	71	58½
Aug. 17, 1922	to Oct. 19, 1922	1 to 3	68	56½
Oct. 19, 1922	to Feb. 13, 1923	1 to 3	66	54½
Feb. 13, 1923	to April 19, 1923	1 to 3	64	52½
‡April 19, 1923	to date†	1 to 3	62	50½

*Level adopted by independent companies Dec. 31, 1920.

‡Since Sept. 21, 1924, Pittsburgh and Lorain basing discounts, jobbers' carloads, Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount or $4 per ton higher net. Chicago takes differential 2½ points less than Pittsburgh-Lorain basis or $5 per ton higher net.

†In final quarter of 1927 an extra 5 per cent was granted to jobbers. This was removed April 2, 1928.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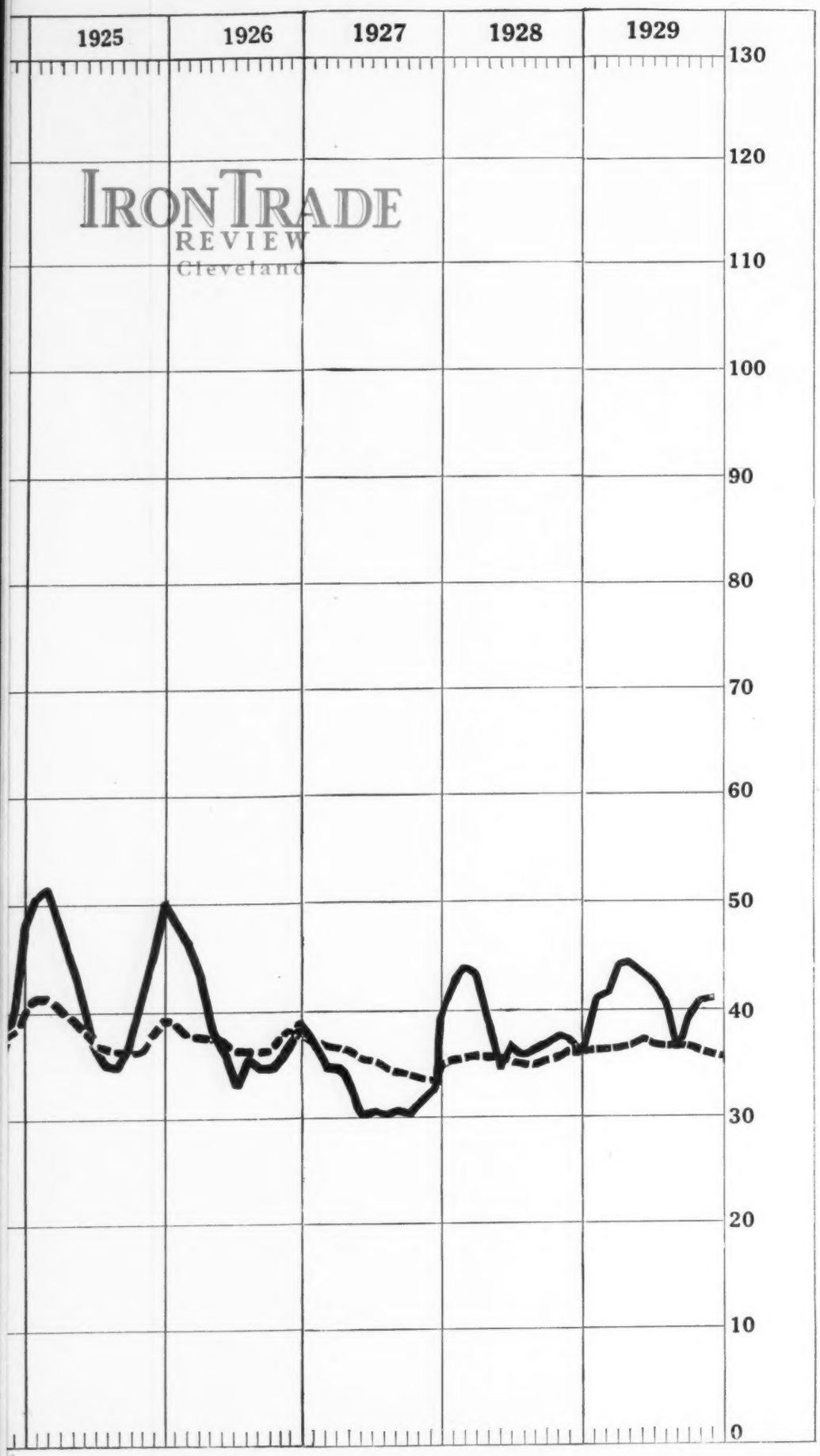
Steel Corporation Unfilled Tonnage
Hundreds of Thousands
Composite Market Average, Dollars
COMPOSITE MARKET TREND
Combined Average Monthly Prices of Fourteen Iron and Steel Products and Monthly Unfilled Tonnage of Steel Corporation Compiled by
IRON TRADE REVIEW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IRON TRADE
REVIEW
Cleveland

Third Tonnage Record for Shapes

Nearly Half Million Tons Above 1928—Mills Pushed to Capacity Most of Year—Higher Buildings Take Much Material

STRUCTURAL shape bookings for the third consecutive year established a record in 1929. With the last two months of the year conservatively estimated, the 1928 total of 3,287,900 tons will be topped by nearly half a million tons.

Shipments also established a record with 3,022,250 tons during the first 10 months. October was again the banner month for shipments, 354,200 tons during that period being a record. The low point was reached in February with 238,00 tons shipped.

Shape mills operated near capacity during most of the year. Up to November lettings ran 18 per cent ahead of last year in the East. Backlogs at the close of the year are larger than at the opening although since Nov. 1 shipments began to cut into order books. Fabricating shops operated above 89 per cent all year.

With a tendency toward heavier sections there was also increased use of junior beams. These were used extensively in airport hangar construction and in buildings of medium height. An interesting development was the settlement between two of the largest producers as to production and marketing of special sections.

The 48,000-ton award for the Empire State building, New York, was a feature. This building for a time at least will be the highest commercial structure in the world. Ten projects took more than 20,000 tons each, six more than 15,000 tons, sixteen over 10,000 tons each, while 55 projects called for more than 5000 tons each.

Subway tonnage in New York called for 125,000 tons. Larger tonnages were also placed for railroad electrification work. It is estimated that more than 75,000 tons of junior beams were used in airport hangar and freight terminal construction. Bridgework also showed a gain, as did industrial building and hotel and apartment house construction. Included among bridge awards was the 21,840,-ton bridge over Carquinez Straits in the West and the 50,000-ton Chesapeake Bay bridge in the East, both going to Steel corporation mills.

Unprecedented tonnage was placed in the middle and far West for highway and bridge work. Much of this was in small lots. In the Chicago district close to 80,000 tons went for bridges. Industrial building in the Chicago district held up, but cumulative effect of three years heavy construction was reflected in office building vacancy which was about 17 per cent. Lettings over 8000 tons were few compared with 1928. For weeks at a time, pressure diverted structural mills at Chicago to other lines. Plain material prices at Chicago maintained a $2 spread over Pittsburgh base.

After a slow start business in the Pittsburgh district picked up in the last half, providing good backlogs into fourth quarter. Industrial plant and bridge work predominated in the Pittsburgh district. Prices opened the year at 1.90c to 2.00c, eased to 1.90c flat and later firmed to 1.95c, only to close at 1.90c again.

Cleveland's fabricating shops, running practically full all year, received support from numerous small buildings, rather than from a large number of big projects. However, a few large jobs were let in that territory. The largest industrial expansion of the year in the immediate Cleveland vicinity was that of the Chase Brass & Copper Co., involving about 6000 tons for two units. The Detroit territory, with 25,000 tons for the plant of the Great Lakes Steel Corp., at Ecorse, Mich., and 4500 tons or more for the Newton Steel Co. plant at Monroe, Mich., nosed Cleveland out of the picture as far as industrial expansion is concerned. Prospects are bright for 1930, however, since 75,000 to 100,000 tons are up in projects for Cleveland and vicinity.

The following table gives 1929 bookings as compared with recent years with the last two months estimated:

	1929	1928	1927	1926
Jan.	273,350	210,000	195,000	208,800
Feb.	265,650	266,250	243,750	208,800
Mar.	358,050	258,750	232,500	234,000
Apr.	334,950	236,250	262,500	252,000
May	342,650	311,250	232,500	266,400
June	346,500	303,750	228,750	262,800
July	350,350	296,250	345,000	248,400
Aug.	365,750	356,250	243,750	284,400
Sept.	319,550	318,750	266,250	216,000
Oct.	342,650	240,000	288,750	230,400
Nov.	*225,000	242,550	236,250	223,200
Dec.	*225,000	246,400	262,500	255,300
Total	3,749,450	3,287,900	3,063,500	2,890,800

*Estimated.

Bar Makers Find Steel Fashions Changing

CHARACTERISTIC of the steel bar market in 1929 was the further trend to broadened uses and the growing application of alloy and special analysis bar mill products in fabrication. Output and sales of carbon steel bars held their own, continued new uses in most markets retrieving the losses to alloy products in automotive lines.

Bar mill tonnage in the West virtually was equivalent to that of 1928, about 15 to 20 per cent ahead of 1927, and 5 to 10 per cent ahead of the previous record period in 1926. Deformed bars for reinforcing, however, again lost ground to rail steel bars in the western markets. In the East bar mill capacity continued somewhat in excess of requirements, while western bar mill operations were at capacity early in the year, dropping below 65 per cent after mid-August. Alloy steel bar mill operations averaged 85 to 90 per cent for the first nine months.

Consumption of soft steel bars was widely diversified. The field of consumption was extended to a score of new uses in general manufacturing and in building. Tractors and farm equipment builders call for increasing tonnages in their specifications. Besides farm equipment makers, leading users included cold rolled finishers, car shops, conveyor and industrial equipment manufacturers, makers of spring steel, bolt, nut and machinery lines. Tractor production dropped off late in the year, although shipments

for about five months averaged nearly 50 per cent ahead of the preceding year. March production of farm implements as a whole was about 26 per cent over March, 1928. Nevertheless sales of thresher-combines, for which a vast market developed in the past few years in the West, dropped 25 to 30 per cent in August.

Bar producers found operations more profitable. Prices averaged about 50 cents a ton above 1928. Merchant bars in the Pittsburgh district settled at 1.90c, after starting the year at 1.90c to 2.00c. Carnegie Steel Co. advanced the price $1 a ton the middle of February, this basis becoming established generally. Demand expanded materially through the early months, backlogs of three to six weeks developing in the spring and early summer in eastern territory, and 12 to 14 weeks in the Chicago district. The market held fairly steadily until September, when occasional concessions of $1 a ton ultimately brought down the price to a flat 1.90c, Pittsburgh. Chicago prices then gravitated toward the usual $2 spread over the Pittsburgh quotation.

Automotive buying was the mainstay of bar mill backlogs. Tapering in automotive demand began in May and by June was off 10 to 15 per cent. This decline did not become acute until September and October. A gradual reduction in other consumers' stocks during the fall months softened somewhat the sharp drop in automotive requirements.

The rapid growth in the production and consumption of corrosion and heat resistant alloy steel bars was a noteworthy feature of changing trends. Alloy steel bars remained at a 2.65c base, while the price of stainless steel bars of the 18-8 classification was held at 28.00c, Pittsburgh, base.

Steady Plate Demand Is Heavy Load on Mills

CONDITIONS in the plate market during 1929 were the best in history. Platemakers had record-breaking outputs, and enjoyed broader and more diversified demand than since prewar years. Mill operations were good during first and last quarters, and were at full capacity during the second and third quarters.

Despite great demand on mills, the situation with respect to supply was flexible at all times. In June, one of the most congested months, some mills had enough tonnage on books to keep them occupied the better part of two months. At no time, however, were most mills further extended than one to three weeks. An interesting angle of plate market history in 1929 was the fact that plate mills were able to maintain high operations without large backlogs.

Plate prices during most of the year were steady and satisfactory from both producing and consuming standpoints. The market opened at 1.90c, base Pittsburgh, and during second and third quarters was firm at 1.95c, settling back to 1.90c in November, when tonnage pressure was tapering off.

One of the most gratifying developments was the restoration of the shipbuilding industry to its old position as a large tonnage consumer of plates. Contracts for large numbers of new vessels, for both ocean and inland waterway traffic, resulted in placing of much plate business.

Another source of greatly improved plate demand was railroad requirements. Car and locomotive orders were placed in much greater volume in 1929 than in 1928. Heavy tonnages were taken by tank shops and miscellaneous manufacturers, who generally exceeded commitments of any previous year. Heavy demand came from the oil and gas industries and large tonnages of plates were required in construction of oil and gas pipe lines. A Milwaukee welded pipe line fabricator during much of the year absorbed plates to the amount of 35,000 to 50,000 tons per month.

A feature of the year was application of plates to many purposes for which castings had served. Welding made many of these uses possible. Another feature was the increased use of heavy plates as bases for structural columns and as foundations for heavy machinery.

Demand for alloy steel plates increased greatly in tonnage and diversity of application. Much progress has been made in the production and sale of corrosion and heat resistant plates of the chrome and chrome nickel series. Analysis of these plates varies considerably, depending on the particular use to which they are put.

Demand for nickel steel also showed considerable increase, particularly in connection with requirements for locomotive boilers. Nearly all of the railroads in this country and Canada now are using nickel steel in locomotives or are investigating its use.

Domestic freight car buying of more than 105,000 cars was the heaviest since 1924, when 144,425 were placed. The total compared with 44,763 in 1928. Locomotive sales are estimated at 900, against about 600 in 1928.

Cast Iron Pipe Sales Close to Previous Years

FEATURING the iron pressure pipe markets were relatively heavier sales of larger diameter pipe. The loss in tonnage from the preceding year was barely 5 per cent, the most decline being in the smaller sizes. Plumbing goods sizes held up with recent years.

Large welded pipe line projects that entered the iron pressure pipe field affected sales, but added to this competition was lack of tax money in some localities, the slow special assessment bond market for municipalities, and sluggish realty and subdivision work.

Prices retained unusual steadiness in North Central markets. Not until the closing weeks of the year did quotations in the Chicago market drop below $37 to $38, base, Birmingham, for the larger diameters. Concessions of 50 cents to $1 were reported then, due largely to competition between a few eastern and western sellers. Due to unusual competition between two interests, weakness was marked in the New York district largely throughout the year. Sales were down to $31 and $32, foundry.

French pipe competed with domestic in volume similar to recent years. Offerings at Detroit, Milwaukee, Bloomington, Ill., Pontiac, Mich., Cincinnati, and along the eastern seaboard brought out bids from French sellers, some $2 to $6 a ton below lowest domestic bids. French sellers booked about 5000 tons of a 20,000-ton order for Detroit.

Autos Give Sheet Mills Busy Year

Other Users Take More Than Usual Tonnage—New Uses Add to Requirements—Prices Steady Until Closing Quarter Brings Slackening

UNUSUALLY heavy demand for sheets for automotive purposes and at least average requirements of other large consuming industries made 1929 a record production year. Railroad car builders increased sheet purchases materially over several preceding years. Consumption of electrical sheets showed a gain over 1928, agricultural implement manufacturers took a near-record tonnage, and heavy operations in the electric refrigerator, radio and metal furniture industries contributed substantially to total demand.

Consumption of blue annealed and most sizes and gages of black sheets continued to expand, with new outlets developing. The galvanized corrugated markets in the South and Southwest held up well, specifications exceeding shipments by as much as 50 per cent during the active outdoor building seasons. Demand for corrosion and heat resistant sheets made notable gains in a variety of uses, particularly in the automotive industry. Its adoption also for decorative and utility purposes on buildings and equipment that are subject to corrosion points to an expanding outlet. Mill operations at Pittsburgh and Youngstown were close to capacity during most of the year, falling below 90 per cent only late in third quarter. Difficulty in obtaining sufficient supplies of semifinished steel, particularly in the Chicago district, retarded operations during midsummer. The capacity of normalizing furnaces was taxed by heavy demand for automobile sheets and several mills took steps to enlarge these facilities.

Prices were steady during the first nine months but weakened considerably in the last quarter. The year opened with mill books comfortably filled. Prices were 2.85c, Pittsburgh, for black sheets, 3.60c for galvanized, 2.10c for blue annealed, and 4.10c for automobile. Quotations were advanced $2 a ton the latter part of February on the first three grades, automobile sheets continuing unchanged in price.

Due to competition of strip sheets, Inland Steel Co. May 11, in opening books for third quarter, announced a new plan of quoting blue annealed sheets, upsetting classifications effective for 40 years. The new method was followed generally by producers. No. 13 gage was used as a base, with gages from 8 to 12 inclusive, grouped as light blue annealed plates. Nos. 9 and 10 were established as the blue annealed light plate gages. Prices were advanced under this classification $1 and $2 a ton for third quarter, making base prices at Pittsburgh 2.35c for sheets and 2.20c for plates.

Weakness developed in black and galvanized during June and the market settled to 2.85c and 3.60c, respectively, by July. Some mills continued to extend the $2 preferential to jobbers on galvanized. By November, black had settled to 2.75c and galvanized to 3.40c. Concessions also developed in blue annealed at 2.25c and 2.10c for the two months. Chicago district mills, on the other hand, broke all production records in October. Substantial tonnages for freight cars, electrical equipment and metal furniture helped cushion the fall during November and December, but operations later fell below 60 per cent.

Year's Sheet Situation Summarized

	Total hot mills U. S.	Sales	Per cent of capacity	Production	Per cent of capacity	Shipments	Per cent of capacity
1927							
November	718	344,519	97.8	232,041	65.9	224,789	63.8
December	719	530,197	154.7	260,130	75.9	221,689	64.7
1928							
January	720	302,921	85.7	316,541	89.6	274,126	77.6
February	718	266,210	79.5	330,565	98.7	298,420	89.1
March	721	399,441	112.4	366,127	103.0	359,532	101.1
April	721	284,070	84.7	327,909	97.8	327,674	97.7
May	721	250,316	68.5	349,367	95.6	326,324	89.3
June	721	318,902	96.5	311,629	94.3	308.741	93.4
July	721	333,357	102.4	267,685	82.2	278,310	85.5
August	721	254,397	71.7	329,396	92.8	324,691	91.5
September	721	370,936	117.5	318,907	101.0	322,876	102.2
October	724	344,614	96.6	369,243	103.5	354,925	99.5
November	726	346,041	101.1	358,402	104.8	307,790	89.9
December	726	323,421	101.8	302,182	95.1	296,687	93.4
1929							
January	725	438,390	123.1	391,404	109.9	362,229	101.7
February	722	389,496	130.8	326,468	109.7	325,848	109.5
March	722	464,297	146.8	364.202	115.2	363,648	115.0
April	722	398,206	122.3	375,256	115.2	377,274	115.9
May	722	279,783	82.4	393,430	115.8	392,336	115.5
June	722	307,911	100.6	337,841	110.4	347,989	113.7
July	723	337,222	102.2	323,905	98.1	344,676	104.4
August	722	282,107	84.4	366,734	109.7	365,649	109.4
September	715	274,568	88.7	302,490	97.7	301,330	97.4
October	712	258,810	77.2	319,660	95.3	291,135	86.8

Rail Buying Aids Mills in Final Quarter

THE annual rail contracting movement in the fall of 1929 came somewhat earlier than usual and was especially appreciated by the steel industry because the heavy rail requirements were entered on mill books at a time when demand for most other rolled steel products was tapering off. The rail tonnage placed in the latter part of 1929 compared favorably with that placed in the latter part of 1928, and requirements of some of the western roads showed an increase.

Tendency toward the use of heavier sections continues pronounced in the rail market. Some roads, those traversing country where the traffic is not heavy, still are buying 85 and 90-pound rails, but the general tendency is toward sections of 100 pounds or more. The heaviest rail rolled continues 136 pounds. Some of the country's principal trunk systems have not yet found it necessary to specify rails heavier than 127 to 130 pounds.

The only significant development

Light Rail Prices by Quarters, 1920-1929

Per Pound

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Jan. 1.	2.45c	3.00c	1.50c	2.15c	2.10c	1.80c	1.80c	1.80c	1.80c	1.80c
April 1	3.25c	2.50c	1.60c	2.25c	1.95c	1.70c	1.70c	1.80c	1.80c	1.80c
July 1	3.75c	2.20c	1.75c	2.25c	1.90c	1.70c	1.70c	1.80c	1.80c	1.80c
Oct. 1	3.50c	1.65c	2.15c	2.15c	1.80c	1.60c	1.80c	1.80c	1.80c	1.80c

with respect to chemical requirements of steel rails is a tendency on the part of a good many roads, following the lead of two prominent eastern systems, to experiment with medium manganese rails. There appears to be no tendency anywhere toward alloy steel rails. There has been no further inquiry into the merits of heat-treated rails. In view of the great headway made by steel mills in improving the quality of ordinary open-hearth steel rails, more expensive methods of producing rails have not found much encouragement.

Makers of track accessories, in addition to enjoying good business during 1929, benefited from the fact that the railroads bought earlier in the fall than usual, and they predicted much easier delivery positions in meeting the customary heavy specifications next spring.

Demand for light rails showed little improvement over 1928.

Ferroalloy Movement Was Unusually Large

AN EXCEPTIONALLY heavy movement of the principal ferroalloys prevailed during the past year, with special price strength noted in tungsten, quoted at the highest levels since the war. Notwithstanding a sharp falling off in the last two months, ferromanganese specifications were of record breaking proportions. Contract prices averaged higher than in the preceding year, holding at $105, duty paid tidewater, until the final month when a $5 reduction was announced. This was believed to have been predicated largely on lower prices for manganese ore. While considerable foreign metal came in, consumers relied chiefly on domestic production. In western territory virtually no foreign ferromanganese was used.

Manganese ore sales were among the heaviest on record, but with prices lower than in the preceding year. At the close quotations were about $3.50 per gross ton under those of a year ago. A leading factor, and one of the outstanding developments of the year, was the substantially increased production of Russian ore, with the Russian government assuming direct operation of its mines, following a period during which these mines were operated by American concessionnaires. United States Steel Corp. was reported as having contracted for a heavy tonnage of this ore about the middle of last year.

Manganese ore came in for special consideration at tariff hearings, domestic producers seeking as much protection as possible. As this is written, the house of representatives stands as favoring the present duty of 1 cent per pound of metallic manganese contained on 30 per cent manganese and higher, while the senate favors a duty of 1 cent on manganese down to 10 per cent.

Spiegeleisen was active with prices on domestic material holding at $34, furnace, in carload lots. Subject, as usual, to differentials on larger quantities, this price was reaffirmed for the first six months of 1930. In the preceding year prices ranged from $32 to $34 at the close. Shipments were at a record rate through the greater part of the year. English spiegeleisen, generally of higher manganese content, was sold in moderate volume.

Among the special ferroalloys there were two outstanding developments during 1929: The highest prices for tungsten since the war, under pressure of greatly enlarged demand; and the reduction in ferrochrome prices on account of growing tonnage. In the tungsten market importers of ore had difficulty in keeping up with demand, and so wolframite ore rose from about $12 a short ton unit, duty paid, last winter to about $16 in late spring and summer, and still was well above $15 and firm in December. Domestic scheelite prices went to $16.50 early in the year and remained unusually steady and firm. As users of tungsten buy mostly these two ores for conversion, they were much more interested in these prices than in ferrotungsten quotations.

Ferrovanadium, ferrosilicon, molybdenum, and high-carbon ferrochrome were unchanged through 1929 and into 1930 contracts. They have been unchanged since the announcements on 1928 contracts.

In low-carbon ferrochrome the maximum 2 per cent was cut 1.50 cents for 1930, and 0.10 per cent was cut 3 cents. Both had been cut 1 cent a year ago. The steady lowering of prices reflects lower costs due to larger production. These alloy materials are increasing rapidly in volume on account of stainless and similar alloys of iron and steel.

Imports and Domestic Production of Manganese Alloys—Imports of Manganese Ores

In Gross Tons

	Production		Imports		Imports
	Ferromanganese	Spiegeleisen	Ferromanganese	Spiegeleisen	Manganese ore
1929*	333,800	131,700	†64,134	.....	‡346,197
1928	315,988	102,498	†47,602	.....	‡207,808
1927	295,849	97,328	†34,018	.....	‡308,594
1926	319,510	74,070	†43,684	.....	‡364,307
1925	260,149	65,747	†77,597	.....	‡289,703
1924	199,418	107,135	†47,811	.....	‡231,393
1923	242,450	123,148	91,066	4,668	‡206,048
1922	150,039	68,589	95,007	8,157	374,451
1921	100,694	55,042	9,057	307	401,000
1920	286,365	110,685	59,254	5,234	601,437
1919	175,009	84,014	33,022	27	333,344
1918	325,133	303,535	27,168	.....	491,303
1917	328,000	187,000	51,800	.....	663,500
1916	245,204	187,233	90,928	.....	576,321
1915	144,260	114,556	55,263	200	313,585
1914	100,731	76,625	82,997	2,870	283,294
1913	119,495	106,980	128,070	77	345,090
1912	125,378	102,561	99,137	1,015	300,661
1911	74,602	104,013	80,263	20,970	176,852
1910	71,376	153,055	114,228	25,383	242,348
1909	82,209	142,831	88,934	16,921	212,765
1908	40,642	111,376	44,624	4,579	178,203
1907	55,918	283,430	87,400	48,994	209,021
1906	55,520	244,980	84,359	103,268	221,260
1905	62,186	227,797	52,841	55,457	257,033

*Estimated. †Includes Spiegeleisen. ‡Manganese content.

Scrap Market Has Profitable Year

Higher Quality Material Being Demanded—Direct Dealing Seems Broadening—Some Scarcity Met at Midyear—Marked Changes Expected

DEMANDS for higher quality iron and steel scrap, due to refinements in melting processes and production of special analysis steel, were prominent during 1928. In most districts consumption of scrap rose to attain record proportions.

Because of broader swings in prices and steadiness of consumption, operations of scrap sellers brought greater profits than in the past three years. In October, a falling demand and a limiting of shipments precipitated sharp price recessions. A spread of $5 a ton developed in the high and low of the heavy melting steel price in the Chicago district, against an average spread of $1.50 to $2 a ton in each of the preceding three years, while in the Pittsburgh district the year's range in price was $4.50 to $5.

Direct dealing, in which scrap consumers bought from source of production, became more marked in eastern territory. In the West direct dealing remained confined to one or two tonnage purchases. Bethlehem Steel Co., which has obtained scrap direct for several years, started installation this year of two scrap preparation plants, at Bethlehem, Pa., and Steelton, Pa., and is shearing and preparing its scrap purchased direct from source. Steelworks consumers in the Pittsburgh district were active in bidding on railroad lists. To the requirements for good scrap is attributed a part of this direct bidding, but the practice unquestionably has broadened.

Heavy melting steel moved in a spirited market early in the year, reaching $17 in the West and $20 in the Pittsburgh district. In the latter territory melting steel usually commanded a premium of 50 cents or more over other grades. Moderate scarcity of quality scrap developed by midsummer. Railroad steel specialties, low phos and other electric furnace grades were at high levels as steel foundry operations were well maintained.

The Chicago district scrap market remained consistently below most other districts, but did not reach a point where it was profitable for sellers to ship outside. Lake boat cargoes were negotiated several times for shipment to Buffalo and other eastern markets, but conditions never warranted actual shipments.

Demand for scrap brought periodic shipments from outside markets into the Chicago district. These included movements from Wisconsin, Minnesota and other western points not ordinarily considered tributary fields. Large shipments of borings came by rail from Detroit and St. Louis early in the year.

Noteworthy growth of metal fabrication in the West for seven or eight years, and a relatively stable steelworks consumption, has developed a normal scrap surplus at Chicago. With the addition of 21 open-hearth furnaces by Illinois Steel Co. in the next two years, as a part of its expansion program, the picture is likely to change. It is indicated western subsidiaries of the United States Steel Corp. may become steady instead of intermittent buyers in the Chicago market.

Export of scrap was steady and heavier toward the end of the year when lower prices aided foreign buyers. Considerable tonnage was loaded at Boston for Danzig and Japanese buyers also took material.

Coal Tar By-Products in Steady Demand

SUSTAINED demand for phenol with a temporary shortage in third quarter and a strong demand for light oil distillates at steady prices marked the coal tar products market in 1929. High production prevailed during the greater part of the year but steady shipments prevented large accumulations.

Demand for phenol was especially heavy from bakelite manufacturers and the bare spot condition of the market brought some premium prices for that material in the late summer and early fall. Imports of phenol were much greater than in 1928, reflecting the heavy demand. Considerable volume of phenol moved during the year at 18 cents.

Production of toluol was larger than last year and the price remained firm and unchanged over the entire period. There was considerable drop in buying by the lacquer industry prevalent during the last three months.

Export demand in benzol was fairly brisk and the increase in requirements for motor fuel was reflected in activity in this product. Buying

Coal Tar Products Market in 1929

F.o.b. Producers' Works

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Benzol	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23
Toluol	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Solvent naphtha	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Phenol	0.17	0.17	0.17	0.17	0.17	0.165	0.165	0.165	0.17	0.17	0.175	0.175
Naphthalene flakes	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.055	0.05	0.05	0.05
Naphthalene balls	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.065	0.06	0.06	0.06
*Sulphate of ammonia	2.30	2.30	2.30	2.30	2.25	2.225	2.225	2.225	2.20	2.155	2.10	2.05

of solvent naphtha fell off during last half without weakening the price structure.

Naphthalene weakened in the last three months. The dye industry curtailed buying during that period. Sulphate of ammonia also developed weakness from July on. Buying was largely reduced on the part of domestic fertilizer interests, export trade remaining fair most of the year, but at low prices.

Warehouses Profit from Mill Congestion

FOR several months in 1929 sales by warehouse operators were on a steadily rising scale. Each month of the first six registered a gain over the preceding one. During that period deferred mill deliveries served to direct considerable business into warehouse channels. Consumers sometimes placed several repeat orders within a week, while waiting for their mill sources to catch up. Many jobbers found March the best month since 1917; others reported the April-May period their best two months in several years.

Then ensued a slight summer lull, and after a pickup in August-September the closing quarter started more auspiciously. However, by November and December mills became aggressive in soliciting small tonnage orders of a strictly warehouse character. Due to this setback, some advantage was lost. In November some jobbers changed their operating hours from 10 to 9 per day in partial retrenchment. For numerous jobbing interests, however, the year closed showing tonnage gains varying from 5 to as much as 25 per cent over 1928. Net profits were practically equal to those in 1928.

Prices were fairly steady all year, most mill fluctuations being absent. In January hoop and band bases were adjusted downward to harmonize with new mill extras. Sheet advances of April-May were fairly well retained, concessions not appearing until December. A new method of quoting blue annealed became universal by July. Late in the year nails lost some of the advance they had made but bright wire and rivet price increases were maintained. A much stronger price situation was brought about in Philadelphia territory through the enlargement of the area for application of the Philadelphia pricing method to include eastern Pennsylvania, southern New Jersey, Delaware and most of Maryland.

Canadian Steel Industry Has Good Growth

TAKING the iron and steel industry as a whole, 1929 responded to hopeful predictions. It is safe to say that, with the exception of some of the war years, the iron and steel industry of Canada experienced one of the best years in its history. From the standpoint of production new records were made.

For the first time since the war, Canadian steel mills could maintain almost capacity operations, and while this rate was not adhered to by all plants, it was not due to lack of orders that production was curtailed. In the case of the Algoma Steel Corp., Sault Ste. Marie, Ont., a large program of construction was entered into, with the result that it became necessary to close down both the 18-inch and 12-inch merchant mills until work to materially increase their productive capacity has been completed, early in 1930. The Steel Company of Canada Ltd., Hamilton, Ont., was also actively engaged in building new plants and additions, which retarded its productive operations. The Dominion Iron & Steel Co., Sydney, N. S., made extensive machinery and tool replacements.

A number of new plants are under construction. Among the latter is the Canadian Steel Corp., which started several years ago to establish a great steel plant at Ojibway, Ont., but after spending close to $10,000,000 stopped building activities and work was held up until last year, when a wire plant, removed from Hamilton, Ont., was installed on the site and production started in a small way. Plans of the corporation call for a tin plate mill that will represent an expenditure of $1,500,000 and have an annual capacity of 60,000 tons.

Much of the improvement in business during the year just brought to a close was due to extensive placing of railway orders for cars, locomotives, rails and track supplies. This business was responsible for full time operations by all participants and the rail mills at Sault Ste. Marie, Ont., and at Sydney, N. S., were speeded up to double turn for a long period.

While there was some curtailment in activities during last quarter, the slump is looked upon as temporary. Railways are again coming forward and the Canadian National and Canadian Pacific have each indicated that they will be spending millions of dollars on equipment for delivery during 1930. The Canadian National Railways has intimated that upward of $20,000,000 worth of business will be let immediately.

Demand for pig iron, semifinished and finished iron and steel during 1929 exceeded that of any previous post-war year, and showed improvement of from 10 to 15 per cent over that of 1928. Improvement in demand for these materials was in turn reflected in an enlarged production from Canadian mills and blast furnaces. While the total output of iron and steel was greater than that of other years since the war, it still was somewhat under the total possible production from all sources in this country. The output of pig iron stood about 10 per cent above that for 1928, while steel was about 17 per cent greater than the year immediately preceding, but fell slightly under the record figure established in 1918, of 1,622,000 tons.

CANADIAN OUTPUT OF PIG IRON
In Gross Tons

Year	Pig Iron	Ferro-alloys
1923	880,018	28,961
1924	593,024	26,400
1925	570,397	25,709
1926	737,503	57,416
1927	709,697	56,514
1928	1,037,535	55,573
1929*	1,101,095	75,606

*December estimated.

CANADIAN OUTPUT OF STEEL
In Gross Tons

	Steel Ingots	Steel Castings
1923	839,710	45,060
1924	625,175	25,515
1925	733,855	18,840
1926	743,550	33,338
1927	867,928	39,710
1928	1,201,477	42,783
1929*	1,254,019	69,054

*December estimated.

Strip Mills Taxed To Meet Needs

Automotive Requirements Lead, with Other Users Active—Better Stabilized Market Avoids Price Fluctuations—New Schedule Works Well

AUTOMOTIVE requirements again took most steel strip tonnage during 1929, despite wider distribution into various consuming lines. Unusually heavy automobile production up to October permitted full operations of strip mills, while a quiet market prevailed during most of fourth quarter, when automotive consumption was light.

Producers entered the year with order books well filled as the result of active December specifications, and record automotive tonnage during first quarter expanded mill backlogs rapidly.

Deliveries on some sizes of hot strip were deferred as far as six weeks and on cold strip even longer deliveries were necessary. Sustained production developed a tight situation in supplies of semifinished steel and operations on occasion were restricted by lack of raw material. In the Chicago district it was necessary for detached mills to obtain much semifinished material from the eastern and southern mills.

Production schedules in all districts called for capacity production through July, tending downward during August and reaching a point below 40 per cent in November and December. Most consuming industries other than automotive took tonnage in fair seasonal volume during fourth quarter but shipments to the latter practically were shut off for a number of weeks.

Prices generally were steady and the confusion in 1928 caused by the variety of width classifications for price basing purposes was lacking. The year opened with hot strip quoted 1.90c to 2.00c, Pittsburgh, for widths up to and including 6 inches, and 1.80c to 1.90c for widths 6 1/16 to 24 inches. Cold-rolled strip was 2.85c to 2.95c. These prices shortly were advanced $2 a ton to minimums of 2.00c and 1.90c for the two sizes of hot strip and 2.95c for cold strip. A new card of extras on cold-rolled strip was announced the middle of February. This card served to equalize the differences in production costs on various widths through a reduction of $15 to $17 a ton on the larger widths and higher prices on the narrow sizes. The base price was reduced to a range of 2.75c to 2.85c. The market held at this level until the end of the year, although the higher figure found application on only small, undesirable orders. Hot strip prices continued 2.00c and 1.90c. Chicago prices were $2 a ton above Pittsburgh base on hot strip but no attempt was made to establish a western base on cold-rolled strip.

Production of corrosion and heat-resistant steel in strip sizes found growing application and contributed a fairly large tonnage late in the year. A number of automobile companies adopted it for use in bright metal parts and increased consumption was indicated for 1930 models as well as for a variety of other purposes on various types of equipment.

New Records Are Set in Metals Consumption

DOMESTIC consumption of nonferrous metals in 1929 established new standards. The high level of business built up in the latter part of 1928 was maintained until the final quarter of 1929.

Prices of most metals ran up rapidly early in the year under stress of demand outstripping production. At the end of first quarter, when stimulated production made itself felt, prices began to slip back to more normal levels. Prominent in this price movement was the trend in copper. Backed by demand that increased more rapidly than that for any other major metal, copper swung from 16.50c in December, 1928, to 24.00c in March, the highest price since the war. Lead and zinc prices also climbed.

The break in April left these metals at profitable prices and with continued large markets. Domestic deliveries of copper continued to run close to 100,000 tons a month or about 20 per cent higher than any level prior to 1928.

Domestic shipments of copper in the first 10 months of the year ran almost to 1,000,000 tons, or larger than in any whole year previously. Export business fell off a little, but the total shipments of copper in the year easily set a new record well above 1,700,000 tons.

Lead and zinc consumption also ran higher than in other years, but the slump in export business was greater than in copper, due to greatly enlarged world output.

Aluminum and nickel set new records of consumption. At times demand for nickel appeared to be running beyond ability of producers to meet it.

Tin was consumed in larger quantities but unlike other metals it did not even maintain the prices of the early part of the year.

Average Monthly Nonferrous Prices in 1929

Prompt, wholesale, prices, cents a pound.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tin, spot Straits, New York	49.151	49.357	48.888	45.880	43.908	44.629	46.320	46.458	45.382	42.301	40.249	30.00
Copper, electro, del. Conn.	16.822	17.971	21.476	19.817	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Zinc, prime western, E. St. L.	6.35	6.35	6.474	6.670	6.609	6.657	6.754	6.80	6.80	6.745	6.227	6.00
Lead, open market, New York	6.65	6.857	7.493	7.187	7.00	7.00	6.805	6.750	6.886	6.873	6.285	6.25
Aluminum, 98-99 per cent, del.	23.90	23.90	23.90	23.90	23.90	23.90	23.90	23.90	23.90	23.90	23.90	23.90
Antimony, spot New York	9.567	9.535	9.498	9.539	8.938	8.834	8.422	8.755	8.675	8.503	8.532	8.50
Nickel, ingot	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00

Prices Tell Market History

Ores and Alloys

Per Gross Ton

Spiegeleisen, 1915-1929

At Producers' Furnaces

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$34.00	$34.00	$34.00	$34.00	$34.00	$34.00	$34.00	$33.20	$33.50	$34.00	$34.00	$34.00
1928.....	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00	33.00	33.00	34.00
1927.....	37.00	37.00	37.00	37.00	35.50	34.80	34.00	33.35	33.00	30.15	30.00	31.00
1926.....	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	38.75	37.00
1925.....	32.00	33.00	33.00	33.00	33.00	32.00	31.50	32.25	33.00	33.00	34.00	34.00
1924.....	39.00	39.00	38.00	38.00	36.75	36.00	35.00	32.50	32.00	31.00	31.75	31.00
1923.....	34.90	35.75	37.25	39.25	43.00	46.00	45.00	45.00	43.50	40.00	39.00	38.00
1922.....	25.50	28.00	28.00	30.00	35.00	35.25	35.00	37.00	38.00	37.75	36.80	35.50
1921.....	46.25	37.75	34.20	32.00	31.75	29.60	27.50	26.20	25.25	24.85	25.00	25.00
1920.....	46.60	57.60	60.40	66.85	75.00	75.00	75.00	79.35	82.00	80.00	74.35	57.90
1919.....	*67.50	*52.50	*42.50	*34.50	*31.35	*27.50	34.00	34.00	34.00	34.00	34.00	39.00
1918.....	59.00	59.00	65.50	*70.00	*71.00	*75.00	*75.00	*75.00	*75.00	*75.00	*75.00	*72.50
1917.....	57.50	66.25	77.50	76.75	78.00	83.00	85.00	81.25	80.50	73.50	63.25	60.00
1916.....	32.50	42.50	55.00	60.00	60.00	55.00	47.50	47.50	45.00	40.00	45.00	50.00
1915.....	25.00	25.50	26.00	26.00	26.00	26.00	26.00	26.00	29.00	30.00	30.00	30.00

*Prices from and including April, 1918, and to and including June, 1919, are for 16 per cent spiegeleisen. All other prices apply to 20 per cent metal.

Ferrosilicon, 10 Per Cent 1916-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$31.00	$31.00	$31.00	$31.00	$31.00	$31.00	$31.00	$30.20	$30.00	$30.00	$30.00	$30.00
1928.....	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
1927.....	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	33.50	32.00	30.00
1926.....	35.00	35.50	36.00	34.40	33.00	33.00	33.00	33.00	33.00	33.25	24.00	34.00
1925.....	39.50	39.50	39.50	37.50	35.50	35.50	35.50	35.50	34.00	33.50	34.25	35.00
1924.....	41.50	42.50	42.25	41.50	40.30	39.50	39.50	39.50	39.50	39.50	39.50	39.50
1923.....	44.50	45.50	47.10	48.50	48.50	48.00	46.50	43.50	43.50	43.50	41.50	41.50
1922.....	38.50	37.50	36.50	37.25	40.50	41.50	41.50	42.50	48.50	50.00	48.00	44.50
1921.....	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	52.50	57.50
1920.....	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50
1919.....	54.00	54.00	52.95	47.40	45.00	47.40	49.75	49.75	49.75	49.75	54.75	58.50
1918.....	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	57.00	57.00	57.00
1917.....	42.00	42.00	49.80	57.00	67.00	82.50	92.25	95.00	95.00	95.00	55.00	55.00
1916.....	28.00	28.00	31.00	31.00	32.00	32.00	32.00	31.80	30.25	30.50	34.60	42.00

Ferrosilicon, 50 Per Cent 1916-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50	$83.50
1928.....	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50	83.50
1927.....	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1926.....	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1925.....	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
1924.....	75.00	75.00	75.00	75.00	75.00	75.00	74.50	74.50	74.50	75.00	75.00	82.50
1923.....	85.00	90.00	92.50	95.00	95.00	87.50	82.50	82.50	82.50	82.50	80.00	75.00
1922.....	57.50	55.00	54.00	55.00	57.50	57.50	55.00	55.00	55.00	70.00	82.50	82.50
1921.....	80.00	92.00	93.00	90.00	80.00	75.00	75.00	65.00	65.00	60.00	60.00	57.00
1920.....	82.00	80.00	83.00	80.00	83.00	82.50	82.50	80.00	82.50	82.50	80.00	80.00
1919.....	145.00	125.00	115.00	110.00	110.00	85.00	80.00	78.00	80.00	85.00	80.00	80.00
1918.....	175.00	175.00	177.50	172.50	170.00	170.00	165.00	153.50	150.00	151.00	150.00	150.00
1917.....	122.50	156.25	175.00	187.50	230.00	230.00	237.50	225.00	212.50	171.25	157.50	172.50
1916.....	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	94.25	95.00	95.00

Ferrochrome, 4-6 Per Cent, 1918-1929

Per Pound of Metallic Chromium Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c	11.00c
1928.....	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1927.....	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
1926.....	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
1925.....	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
1924.....	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75	10.75
1923.....	12.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1922.....	14.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	13.00	13.50	13.50
1921.....	17.50	17.25	17.25	16.25	16.00	15.00	15.00	14.00	14.50	14.50	14.50	14.50
1920.....	22.50	19.50	19.50	19.50	18.50	18.50	21.50	20.00	18.50	18.50	18.50	18.50
1919.....	41.00	32.50	31.00	31.00	32.00	32.00	32.00	32.00	29.00	29.00	28.00	28.00
1918.....	.....	.....	.....	.....	.....	.....	44.00	41.00	41.00	41.00	41.00	41.00

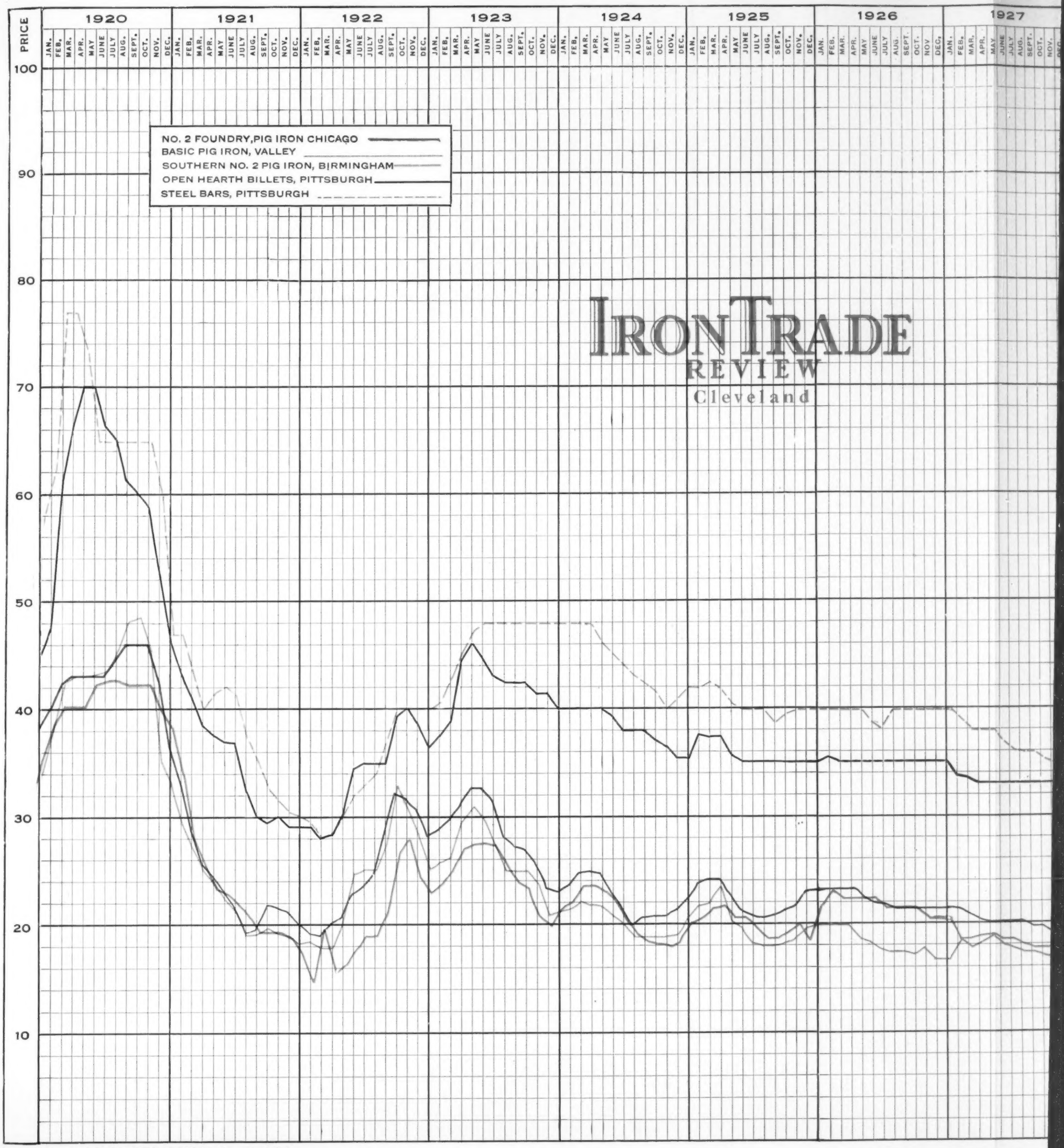
Ferrotungsten, 1918-1929

Per Pound of Metallic Tungsten Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$1.04	$1.04	$1.09	$1.30	$1.32	$1.36	$1.38	$1.43	$1.45	$1.45	$1.45	$1.47
1928.....	0.94	0.93	0.93	0.93	0.95	0.96	0.97	0.97	0.97	0.97	0.98	1.00
1927.....	1.05	1.05	1.01	1.00	0.98	0.98	0.96	0.94	0.92	0.92	0.92	0.95
1926.....	1.14	1.14	1.14	1.09	1.08	1.00	1.00	1.00	1.00	1.00	1.05	1.05
1925.....	0.86	0.88	0.93	1.02	1.00	1.01	1.07	1.07	1.10	1.11	1.12	1.15
1924.....	0.87	0.86	0.88	0.90	0.91	0.90	0.89	0.87	0.87	0.87	0.87	0.87
1923.....	0.87	0.87	0.89	0.90	0.92	0.92	0.95	0.88	0.87	0.87	0.87	0.87
1922.....	0.42	0.37	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.85	0.92	0.92
1921.....	0.65	0.57	0.57	0.47	0.47	0.50	0.50	0.47	0.36	0.36	0.36	0.36
1920.....	1.05	1.05	1.00	1.00	1.05	1.07	1.12	1.10	1.10	0.95	0.95	0.95
1919.....	2.35	2.15	2.07	1.75	1.40	1.32	1.30	1.22	1.25	1.25	1.20	1.15
1918.....	1.95	2.72	1.98	2.32	2.26	2.23	2.25	2.32	2.32	2.55	2.65	2.45

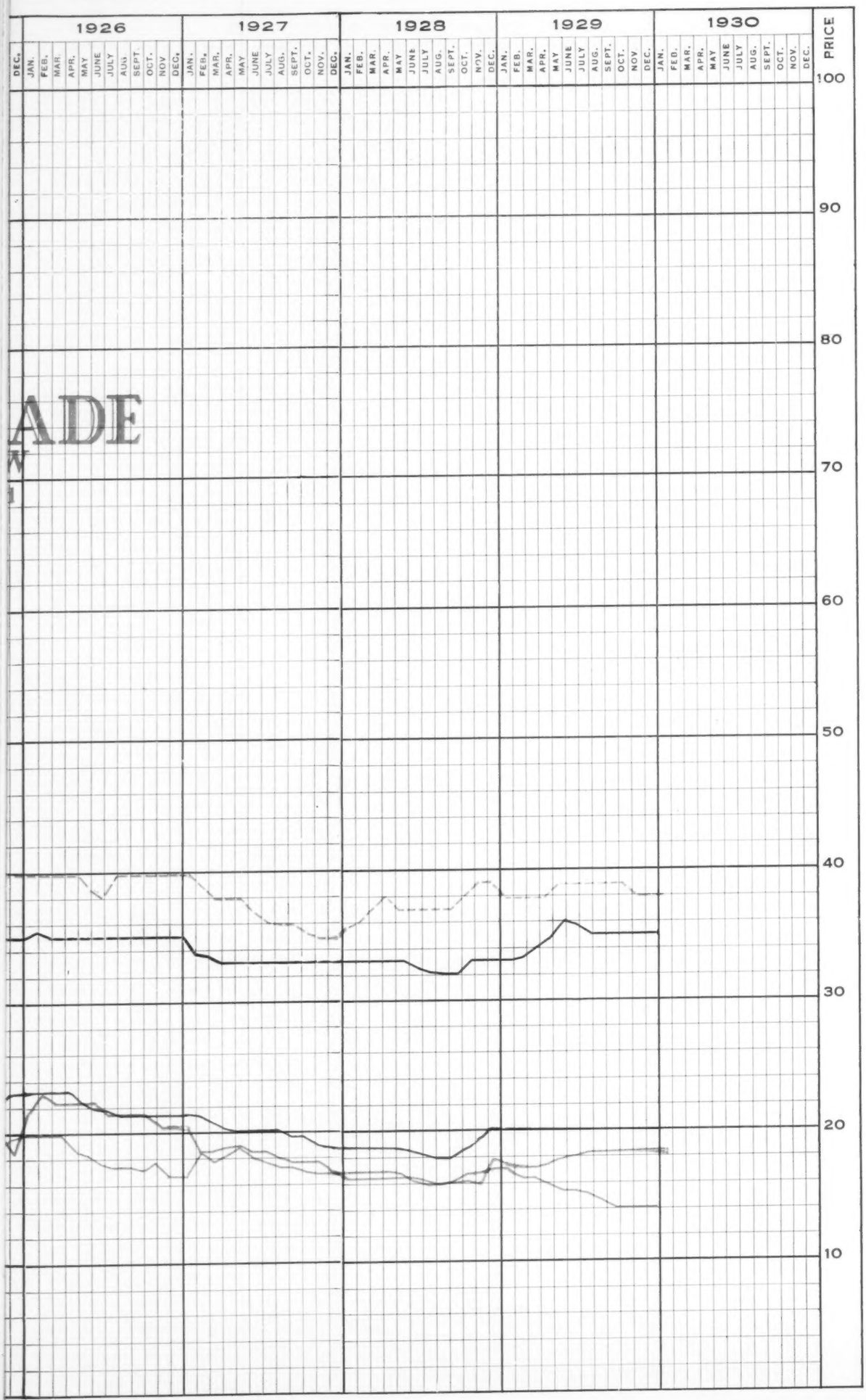
Monthly Prices of Typical Iron and Steel Products fo

Finished Steel Prices in Net Tons, Pig Iron and Billets in Gross Tons



Steel Products for Past Decade

Iron and Billets in Gross Tons


1926
1927
1928
1929
1930
DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PRICE
100
90
80
70
60
50
40
30
20
10

Market History—

Ferromanganese, Delivered, Pittsburgh, 1914-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	$109.79	$109.79	$109.79	$109.79	$109.79	$109.79	$109.79	$109.79	$109.79	$109.79	$109.79	$104.79
1928	104.79	104.79	104.79	104.79	108.19	109.79	109.79	109.79	109.79	109.79	109.79	109.79
1927	104.79	104.79	104.79	104.79	98.54	94.79	94.79	94.79	94.79	94.79	94.79	103.42
1926	119.79	119.79	102.29	92.79	92.79	92.79	92.79	92.79	92.79	99.79	104.79	104.79
1925	116.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79	119.79
1924	113.79	112.29	112.29	112.29	112.29	112.79	110.79	98.79	97.79	104.79	107.29	109.79
1923	109.79	112.29	120.79	124.79	129.79	129.79	122.29	122.29	114.79	112.79	113.79	113.79
1922	61.90	65.32	67.82	69.07	72.32	72.82	72.29	72.29	†80.59	105.47	104.92	104.92
1921	101.00	96.85	89.00	87.50	83.00	76.50	75.00	70.75	64.75	61.65	60.00	60.00
1920	146.00	160.00	172.00	200.00	200.00	198.00	190.00	193.75	172.40	156.40	153.00	120.00
1919	*212.50	165.00	134.00	113.75	110.00	111.75	111.00	110.00	105.00	110.00	110.00	121.00
1918	250.00	250.00	250.00	250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*236.00
1917	175.00	192.50	212.50	250.00	375.00	400.00	400.00	387.50	380.00	300.00	247.50	242.50
**1916	139.88	215.13	334.75	412.50	347.75	244.88	198.75	173.18	167.67	160.00	155.00	162.50
1915	68.00	78.80	95.00	95.00	97.00	105.00	103.57	101.36	110.00	109.64	100.42	103.04
1914	43.57	39.01	39.02	38.68	38.16	38.00	37.54	102.08	93.45	70.80	67.85	68.00

*Prices from May, 1918, to January, 1919, inclusive, were based on 70 per cent ferromanganese. All other prices in above table were based on 80 per cent metal.

†Duty of 1 7/8 cents per pound contained manganese became effective on ferromanganese Sept. 21.

**Quotations seaboard to Jan., 1917, delivered Pittsburgh thereafter.

Manganese Ore, 1915-1929

Dollars Per Gross Ton, Duty Paid, North Atlantic Ports, on Basis of 50 Per Cent Ore

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	27.70	27.70	27.70	27.70	27.70	27.70	26.70	26.70	26.70	25.70	25.70	25.70
1928	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	30.20	29.20	29.20
1927	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70
1926	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70	30.70
1925	32.20	32.70	33.20	33.20	32.70	32.20	32.20	32.20	31.70	31.70	31.70	31.70
1924	31.20	32.70	23.20	32.20	32.20	31.70	30.70	30.20	30.20	30.20	31.70	32.20
1923	29.45	29.45	31.70	33.20	32.70	32.95	32.95	32.95	31.70	31.70	31.70	31.70
1922	10.50	11.00	12.50	12.75	12.75	13.25	13.50	13.75	*14.35	25.50	25.50	25.50
1921	18.75	17.50	17.25	14.00	14.00	12.50	12.50	12.50	12.50	12.50	12.50	12.00
1920	30.00	38.75	38.75	32.25	35.00	37.50	42.25	35.00	35.00	32.75	25.00	21.25
1919	55.50	38.75	37.50	30.00	30.00	30.00	31.25	31.25	30.00	27.50	27.50	27.50
1918	63.75	63.75	60.00	65.00	65.00	65.00	68.50	65.00	65.00	65.00	62.50	55.00
1917	30.00	30.00	40.00	40.00	50.00	50.00	50.00	50.00	60.00	60.00	60.00	60.00
1916	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	30.00	30.00	30.00	30.00
1915	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	22.50	22.50	22.50	22.50

*After Sept., 1922, duty 1c per pound metallic content, $11.20 per gross ton 50 per cent ore.

Pig Iron

Per Gross Ton

Malleable, f.o.b. Valley, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	$18.00	$18.00	$18.10	$18.50	$18.80	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00
1928	17.25	17.25	17.25	17.25	17.25	17.00	17.00	17.00	17.10	17.35	17.90	18.00
1927	18.50	18.10	18.40	18.50	18.50	18.25	17.50	17.50	17.50	17.50	17.50	17.25
1926	20.50	20.50	20.50	19.30	19.00	18.00	17.80	17.50	17.70	18.35	19.75	19.00
1925	22.75	22.25	21.25	20.10	19.00	18.50	18.50	18.50	18.80	19.35	20.35	20.50
1924	22.00	23.00	22.50	22.20	21.30	19.75	19.00	19.00	19.50	19.50	19.75	20.50
1923	27.25	27.25	29.20	31.00	30.20	28.25	25.50	24.70	24.60	23.25	20.40	22.00
1922	19.45	19.00	19.00	20.40	24.60	24.50	25.00	28.60	34.00	32.30	29.25	26.25
1921	32.25	28.75	26.40	24.90	23.75	22.60	20.40	20.00	20.40	20.20	20.00	20.00
1920	38.95	41.60	42.35	41.60	41.60	41.85	43.40	48.25	50.50	48.25	40.40	36.00
1919	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	27.75	31.75	36.40
1918	33.50	33.50	34.45	34.45	34.45	34.65	34.90	34.90	34.90	34.50	34.50	34.50
1917	31.00	33.50	36.00	39.00	42.70	40.10	53.00	54.00	49.60	34.25	33.50	33.50
1916	19.00	18.65	18.50	18.50	18.50	18.50	18.50	18.50	18.55	20.15	25.85	30.75
1915	12.75	12.75	12.85	12.50	12.50	12.50	12.65	13.75	14.50	14.60	15.50	17.90
1914	13.15	13.19	14.15	13.25	13.25	13.00	13.00	13.00	13.00	12.90	12.75	12.75
1913	17.25	17.20	16.75	15.75	14.85	14.40	14.15	14.00	14.05	14.25	13.85	13.50

Basic, Valley, 1902-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	$17.50	$17.50	$17.60	$18.00	$18.30	$18.50	$18.50	$18.50	$18.50	$18.50	$18.50	$18.50
1928	17.00	17.00	17.00	16.75	16.20	15.80	15.95	16.00	16.10	16.85	17.70	17.50
1927	18.50	17.85	18.50	19.00	18.10	17.90	17.50	17.50	17.15	17.00	17.00	17.00
1926	20.00	19.50	21.00	19.80	19.25	19.00	18.70	18.00	18.20	19.10	19.25	19.75
1925	21.90	22.00	21.40	20.20	19.90	18.20	18.00	18.00	18.30	18.80	19.90	20.00
1924	21.40	22.00	21.70	21.70	20.70	20.00	19.00	19.00	19.00	19.00	19.25	20.50
1923	25.90	26.10	29.80	31.00	29.80	27.35	25.15	25.00	25.00	23.75	20.80	21.00
1922	18.30	17.95	17.95	20.20	24.65	25.00	25.00	27.40	32.90	30.50	28.10	25.20
1921	29.35	17.15	24.80	23.95	22.05	21.35	19.00	19.00	19.70	19.30	19.10	18.05
1920	38.20	42.25	43.00	43.00	34.25	43.65	45.75	48.50	48.50	45.25	34.90	33.00
1919	30.00	30.00	28.95	25.75	25.75	25.75	25.75	25.75	25.75	25.75	30.15	34.20
1918	33.00	33.00	33.00	32.00	32.00	32.00	32.00	32.00	32.00	33.00	33.00	33.00
1917	30.00	30.00	32.55	38.00	41.90	49.15	52.85	49.40	41.35	33.00	33.00	33.00
1916	17.85	18.00	18.25	18.00	18.15	18.00	18.00	18.00	18.65	20.30	27.25	30.00
1915	12.50	12.50	12.50	12.50	12.65	12.70	12.95	14.35	15.00	15.00	15.50	17.50
1914	12.35	13.05	13.05	13.00	13.00	13.00	13.00	13.00	13.00	12.85	12.50	12.50
1913	16.45	16.30	16.05	15.70	14.90	14.50	14.20	14.05	14.15	13.70	13.00	12.50
1912	12.40	12.25	12.75	13.00	13.00	13.20	13.50	14.00	15.15	16.20	16.20	16.45
1911	13.30	13.60	13.75	13.75	13.40	13.05	13.00	13.00	12.70	12.50	12.30	12.45
1910	16.90	16.30	16.00	15.95	15.05	14.70	14.50	14.00	13.85	13.15	13.35	13.45
1909	15.50	15.20	14.95	14.15	14.15	14.95	15.00	15.25	15.90	16.95	17.50	17.00
1908	17.10	17.00	16.00	16.00	14.85	15.25	14.50	14.60	14.25	14.25	14.95	15.50
1907	22.00	22.00	21.00	21.00	23.00	22.25	21.95	21.45	20.10	19.70	18.75	18.00
1906	17.00	16.70	17.00	17.15	17.25	17.50	17.25	17.75	18.40	19.30	21.00	23.00
1905	15.25	15.25	15.50	15.00	15.00	14.35	14.25	14.50	14.70	15.00	16.75	16.50
1904	12.85	12.50	12.90	13.10	12.50	11.65	11.35	11.75	11.65	12.05	13.95	19.65
1903	20.95	21.25	21.10	20.60	19.35	19.15	18.55	15.35	16.00	15.10	14.15	13.10
1902	19.75	16.15	16.50	17.50	15.75	20.65	20.60	20.60	20.65	20.70	20.90	20.90

Market History—

Bessemer, Delivered, Pittsburgh, 1895-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$19.96	$19.86	$20.11	$20.26	$20.56	$20.76	$20.76	$20.76	$20.76	$20.76	$20.76	$20.76
1928.....	19.26	19.26	19.21	19.26	19.26	18.76	18.76	18.76	18.86	19.11	19.96	20.01
1927.....	21.26	20.76	21.16	21.26	20.86	20.66	20.26	20.26	19.86	19.76	19.76	19.26
1926.....	22.76	22.76	22.76	21.56	21.01	20.76	20.46	19.76	19.96	20.86	22.01	11.25
1925.....	24.66	24.66	23.96	26.76	21.66	20.76	20.76	20.76	21.06	21.56	22.66	22.76
1924.....	24.66	25.01	24.86	24.61	24.06	23.26	21.66	21.76	21.76	21.76	22.11	23.26
1923.....	29.27	29.57	31.67	32.77	32.07	30.27	28.52	28.07	28.27	27.27	25.47	24.27
1922.....	21.51	21.31	21.21	22.46	26.46	26.96	26.76	29.16	35.27	35.12	27.77	30.33
1921.....	33.96	30.96	28.96	27.46	26.06	25.06	22.96	21.96	22.46	22.06	21.96	21.96
1920.....	40.00	43.15	43.40	43.50	43.90	44.25	46.80	49.50	50.45	50.17	42.33	36.96
1919.....	33.60	33.60	32.55	29.35	29.35	29.35	29.35	29.35	29.35	29.35	32.00	36.65
1918.....	37.25	37.25	37.25	36.15	36.15	36.40	36.60	36.60	36.60	36.60	36.60	36.60
1917.....	35.95	35.95	37.45	42.20	44.95	55.20	57.95	55.55	48.27	37.25	37.25	37.25
1916.....	21.32	21.45	21.55	21.95	21.95	21.95	21.95	21.95	22.20	24.33	30.35	35.95
1915.....	14.70	14.63	14.55	14.55	14.55	14.58	14.88	15.89	16.80	16.95	17.45	19.70
1914.....	15.00	15.09	15.15	14.90	14.90	14.90	14.90	14.90	14.90	14.85	14.70	14.70
1913.....	18.15	18.15	18.15	17.90	17.90	17.26	16.65	16.52	16.65	16.60	16.09	15.90
1912.....	15.15	15.00	15.02	15.15	15.15	15.15	15.15	15.43	15.93	17.75	18.05	18.15
1911.....	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.39	15.10	15.15
1910.....	19.90	19.42	18.90	18.15	17.09	16.73	16.40	16.21	15.90	15.90	15.90	15.90
1909.....	17.34	16.78	16.34	15.80	15.48	16.13	16.37	17.13	18.33	19.68	19.80	19.90
1908.....	19.00	17.90	17.86	17.49	16.92	16.90	16.73	16.11	15.90	15.48	16.74	17.40
1907.....	22.92	22.78	22.85	22.16	24.10	24.10	23.30	22.90	22.90	22.80	20.60	19.90
1906.....	17.32	17.29	17.26	17.25	17.24	17.38	17.57	17.96	18.44	20.06	21.96	22.75
1905.....	16.85	16.45	16.35	16.30	16.20	15.65	15.00	15.40	15.90	16.50	17.70	18.10
1904.....	13.60	13.35	13.85	14.10	13.60	12.60	12.50	12.65	12.75	13.35	15.25	16.60
1903.....	22.35	22.35	22.00	21.60	20.00	19.85	19.00	17.85	16.35	15.85	15.25	14.35
1902.....	16.70	16.93	17.56	18.37	20.95	21.25	22.00	21.75	21.75	21.95	22.25	22.12
1901.....	13.25	13.60	16.56	16.69	16.65	15.94	16.00	15.90	15.71	15.90	16.10	16.35
1900.....	24.90	24.90	24.90	24.90	24.90	19.75	18.00	16.05	14.00	13.25	13.65	13.55
1899.....	11.00	11.75	14.00	15.15	16.25	19.00	20.75	22.00	23.50	24.00	24.50	25.00
1898.....	9.90	10.15	10.40	10.50	10.50	10.40	10.35	10.40	10.40	10.30	10.20	10.65
1897.....	10.50	10.65	10.50	10.00	9.35	9.35	9.00	9.05	10.00	10.25	10.25	9.90
1896.....	12.30	12.80	12.00	13.15	12.75	12.40	12.20	11.45	11.25	11.50	12.30	11.40
1895.....	10.00	10.15	10.25	10.75	11.25	12.00	14.00	14.75	17.25	15.75	14.00	12.25

No. 2 Foundry, f.o.b. Valley, 1904-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$17.50	$17.50	$17.75	$18.15	$18.50	$18.50	$18.50	$18.50	$18.50	$18.50	$18.50	$18.50
1928.....	17.25	17.25	17.25	17.25	17.10	16.75	16.50	16.50	16.85	17.00	17.70	18.00
1927.....	18.43	18.06	18.37	18.50	18.50	18.20	17.50	17.50	17.50	17.50	17.45	17.25
1926.....	20.50	20.50	20.50	19.30	19.00	18.00	17.80	17.50	17.70	18.35	19.60	19.00
1925.....	22.25	22.00	21.25	20.20	18.85	18.50	18.50	18.75	19.20	20.40	00.00	20.50
1924.....	22.40	23.00	22.50	21.75	20.90	19.50	19.00	19.25	19.50	19.50	19.60	20.50
1923.....	27.00	27.00	29.60	31.00	30.15	27.75	25.60	24.70	24.75	23.40	22.00	22.00
1922.....	20.05	19.20	19.20	20.55	23.95	24.20	24.20	31.00	35.25	31.85	28.40	25.00
1921.....	31.10	28.20	26.20	25.05	23.80	22.50	20.30	20.10	21.20	21.20	20.05	20.35
1920.....	40.90	42.40	43.40	44.20	45.40	45.40	46.40	49.65	50.95	48.95	42.95	37.20
1919.....	31.00	31.00	29.10	26.75	26.75	28.15	28.15	28.15	29.50	34.95	33.35	38.15
1918.....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917.....	32.35	34.25	37.20	39.99	42.95	51.40	55.90	54.70	49.05	33.00	33.00	33.00
1916.....	18.90	18.75	18.75	18.90	18.70	18.50	18.50	18.50	18.65	20.75	26.10	31.30
1915.....	13.25	13.25	13.25	12.95	12.75	12.75	12.85	13.95	14.75	14.85	15.90	17.50
1914.....	12.89	13.25	13.40	13.50	13.50	13.50	13.50	13.30	13.25	13.10	12.90	13.05
1913.....	17.50	17.30	16.75	15.80	14.80	14.15	13.85	13.80	14.00	13.90	13.90	13.50
1912.....	13.00	13.10	13.20	13.35	13.30	13.30	13.50	13.85	14.50	16.15	17.30	17.50
1911.....	18.75	13.75	13.85	13.85	14.75	13.60	13.50	13.50	13.50	13.50	13.15	12.80
1910.....	17.00	16.55	16.10	15.75	15.35	14.65	14.20	14.10	14.40	13.95	13.75	13.75
1909.....	15.35	15.00	14.85	14.25	14.35	14.85	15.25	15.35	16.25	17.10	17.25	17.25
1908.....	16.35	16.00	15.70	15.10	14.50	15.35	15.10	15.00	14.60	14.20	15.50	15.50
1907.....	23.30	24.00	24.00	24.00	24.50	24.50	23.15	22.55	21.30	20.05	19.15	17.05
1906.....	17.55	17.25	17.15	16.75	16.65	16.25	16.50	18.00	19.00	20.50	23.00	23.75
1905.....	16.50	16.15	16.00	16.15	15.75	14.35	14.35	14.55	14.75	15.65	16.85	17.25
1904.....	12.50	12.25	13.00	12.90	12.15	11.65	11.50	11.65	11.75	12.40	15.00	16.00

No. 2 Foundry, f.o.b. Chicago, 1895-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00
1928.....	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00
1927.....	20.90	20.25	20.00	20.00	20.00	20.00	20.00	19.50	19.50	18.75	18.50	18.50
1926.....	23.00	23.00	23.00	22.00	21.65	21.10	21.00	21.00	21.00	21.00	21.00	21.00
1925.....	23.80	24.00	24.00	22.60	21.25	20.25	20.30	20.50	21.10	21.60	22.75	23.00
1924.....	23.70	24.40	24.50	24.40	22.80	21.40	19.80	20.40	20.50	20.50	21.00	22.00
1023.....	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
1922.....	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.00
1921.....	32.75	28.65	25.80	24.25	23.00	21.10	19.15	19.60	21.75	21.50	21.00	20.00
1920.....	40.00	42.25	43.00	43.00	43.00	43.00	44.40	46.00	46.00	46.00	42.40	36.50
1919.....	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	31.75	31.75	38.30
1918.....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917.....	30.00	31.25	35.70	39.25	43.20	51.00	55.00	55.00	49.50	33.00	33.00	33.00
1916.....	18.50	18.50	18.70	19.00	19.00	19.00	19.00	19.00	18.65	19.15	25.00	29.25
1915.....	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	13.80	14.45	17.10	18.00
1914.....	14.25	14.20	14.25	14.25	14.25	14.20	14.00	14.00	13.65	13.30	13.00	13.00
1913.....	18.00	18.00	17.60	17.25	16.70	16.10	15.20	15.00	15.00	15.00	15.00	14.50
1912.....	14.00	14.00	14.00	14.25	14.50	14.50	14.60	15.30	16.35	17.30	17.85	18.00
1911.....	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.50	14.50	14.50	14.00	14.00
1910.....	19.00	18.75	18.25	17.00	16.75	16.50	16.50	16.50	16.50	16.00	16.00	16.00
1909.....	17.45	16.75	16.50	16.45	16.20	16.40	16.90	17.35	18.20	18.85	19.00	19.00
1908.....	18.25	17.85	17.40	17.20	17.00	17.30	17.00	17.00	16.75	16.50	16.75	17.35
1907.....	26.00	26.50	26.75	27.50	27.40	26.50	25.40	24.50	23.60	22.60	20.60	19.00
1906.....	19.25	19.25	19.00	18.75	18.50	18.10	18.30	18.90	19.75	21.50	26.50	27.00
1905.....	17.50	17.50	17.50	17.50	17.25	16.60	16.15	16.35	16.50	17.55	18.90	19.50
1904.....	14.10	13.75	13.55	14.00	13.80	13.40	13.30	13.35	13.40	13.70	15.60	16.60
1903.....	25.00	24.00	24.00	23.00	21.70	20.50	18.50	17.50	16.85	15.90	14.50	14.30
1902.....	15.80	16.75	18.60	19.75	21.75	22.50	23.40	24.65	27.15	27.15	26.90	25.40
1901.....	14.60	14.10	15.20	15.50	15.50	15.50	15.50	15.20	15.00	15.00	15.00	15.50
1900.....	24.50	24.50	23.75	23.25	22.00	20.25	17.75	15.50	14.50	14.00	14.25	14.60
1899.....	11.25	12.00	14.25	15.00	15.25	17.00	17.00	20.00	22.00	23.00	23.50	24.50
1898.....	10.50	10.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1897.....	11.00	10.75	10.75	10.75	10.25	10.00	10.00	10.00	10.25	10.75	10.75	10.50
1896.....	13.50	12.25	12.00	12.00	11.75	11.25	11.25	11.20	10.80	10.75	11.10	11.25
1895.....	9.75	9.75	9.75	10.00	10.25	10.75	12.50	13.50	13.50	14.50	14.50	14.00

Market History—

Southern No. 2, f.o.b. Birmingham, 1904-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$16.50	$16.50	$16.00	$15.50	$15.50	$15.25	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00
1928.....	16.00	16.00	16.00	16.00	16.00	15.90	15.50	15.65	16.25	16.25	16.30	16.50
1927.....	18.50	18.00	18.00	18.00	18.00	18.00	17.43	17.25	17.25	17.25	16.00	16.00
1926.....	22.75	22.00	22.00	22.00	22.00	21.00	21.00	21.00	20.80	20.00	20.00	20.00
1925.....	20.10	20.75	21.00	20.00	20.00	19.00	18.00	18.00	18.50	19.50	21.00	21.20
1924.....	21.60	23.00	23.00	22.20	21.60	20.00	18.20	17.90	17.65	17.50	17.90	19.50
1923.....	23.30	24.50	26.50	27.00	27.00	26.75	25.00	23.60	22.75	20.20	19.25	21.00
1922.....	16.15	19.25	15.25	16.00	17.60	18.50	18.50	20.70	26.25	27.40	24.00	22.50
1921.....	33.75	27.70	25.10	23.00	22.50	21.70	20.25	19.00	19.00	19.00	18.25	17.00
1920.....	38.20	40.00	40.00	40.00	42.00	42.30	42.30	42.00	42.00	42.00	39.50	38.00
1919.....	31.00	31.00	30.00	26.75	26.25	25.25	25.00	26.75	26.75	27.45	30.65	35.15
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917.....	23.00	24.50	28.00	35.80	35.75	35.75	46.00	48.00	43.50	33.50	33.50	33.50
1916.....	14.50	14.65	15.00	15.00	15.00	14.45	14.00	13.60	14.40	15.15	19.60	23.00
1915.....	9.50	9.50	9.40	9.35	9.75	9.55	9.60	11.00	11.30	11.75	13.15	14.20
1914.....	10.50	10.50	10.60	10.50	10.50	10.45	10.05	10.00	10.00	10.00	9.90	9.50
1913.....	13.70	13.50	13.00	12.50	11.75	10.60	10.50	11.00	11.00	11.00	10.75	11.00
1912.....	10.00	10.00	10.05	10.50	10.95	11.00	11.25	11.65	12.50	13.45	13.75	13.50
1911.....	11.00	11.00	11.00	11.00	10.75	10.25	10.00	10.05	10.10	10.00	9.75	10.00
1910.....	14.00	13.90	13.00	12.10	11.80	11.60	11.40	11.00	11.00	11.00	11.00	11.00
1909.....	13.00	12.70	11.75	11.00	11.00	11.30	12.30	13.00	14.00	14.50	14.50	14.00
1908.....	12.80	12.50	12.10	11.90	11.50	12.00	11.60	12.05	12.50	12.50	12.50	13.00
1907.....	23.00	23.00	22.75	22.00	21.40	21.25	20.50	19.80	18.10	17.65	16.00	14.90
1906.....	14.00	14.00	13.70	13.65	13.75	13.50	13.00	14.15	16.00	17.15	21.25	22.00
1905.....	13.50	13.50	13.50	13.25	12.75	11.85	11.00	11.65	11.75	12.50	14.00	14.00
1904.....	9.75	9.50	9.70	10.00	9.65	9.15	9.15	9.50	9.50	10.65	12.75	13.05

Malleable, f.o.b. Chicago, 1913-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00
1928.....	18.50	18.50	18.50	18.50	18.20	18.00	17.60	17.60	18.25	18.80	20.00	20.00
1927.....	20.90	20.25	20.00	20.00	20.00	20.00	20.00	19.50	19.50	18.75	18.50	18.50
1926.....	23.00	23.00	23.00	22.00	21.65	21.10	21.00	21.00	21.00	21.00	21.00	21.00
1925.....	24.00	24.00	24.00	22.70	21.25	20.25	20.50	20.50	21.10	21.60	22.75	23.00
1924.....	23.70	24.40	24.50	24.40	22.80	21.40	19.80	20.40	20.50	20.50	21.00	22.00
1923.....	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
1922.....	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.25
1921.....	33.25	29.00	26.25	24.75	23.50	21.20	19.15	19.40	21.75	21.20	21.00	20.00
1920.....	40.50	42.75	43.50	43.50	43.50	43.50	44.90	46.50	46.60	46.50	43.00	37.50
1919.....	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	28.00	32.25	38.80
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	34.50	34.50	34.50
1917.....	30.00	31.25	35.80	39.00	43.20	50.50	55.00	55.00	49.50	33.35	33.50	33.50
1916.....	19.00	19.00	19.00	19.50	19.50	19.50	19.50	19.50	19.15	19.50	25.00	29.25
1915.....	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	14.20	15.10	17.40	18.00
1914.....	14.25	14.25	14.25	14.25	14.25	14.25	14.00	14.00	13.50	13.50	13.00	13.00
1913.....	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.40

No. 2X Foundry, Delivered, Philadelphia, 1910-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$22.26	$22.01	$22.26	$22.26	$22.76	$22.76	$22.76	$22.26	$22.26	$22.26	$22.26	$22.01
1928.....	20.51	20.91	21.26	21.26	21.26	21.26	20.76	20.76	21.01	21.76	21.51	21.76
1927.....	22.76	22.26	22.26	22.26	22.26	22.01	21.51	21.26	21.01	20.66	20.51	20.26
1926.....	24.26	24.01	23.26	23.26	23.01	22.76	22.26	22.01	22.26	22.51	23.51	23.76
1925.....	25.61	25.26	24.51	23.16	21.76	21.51	21.26	21.76	21.86	22.61	24.01	24.26
1924.....	24.26	24.26	24.13	23.73	22.60	21.76	21.76	21.76	21.26	21.36	22.98	24.88
1923.....	29.56	30.10	32.00	32.75	32.75	30.60	28.00	25.80	26.20	24.50	23.00	24.26
1922.....	21.55	21.35	23.60	23.75	25.60	27.20	27.90	32.15	34.25	33.00	30.50	28.45
1921.....	35.00	31.00	27.40	26.25	26.10	26.00	23.50	21.00	21.40	22.00	22.50	22.10
1920.....	43.90	45.00	45.68	46.80	46.90	46.90	48.55	50.95	53.75	52.65	46.75	38.95
1919.....	36.15	36.15	35.10	31.00	30.10	29.60	29.50	29.60	29.95	32.00	35.85	40.75
1918.....	34.25	34.25	34.25	34.25	34.25	34.25	34.50	34.50	34.50	38.85	39.15	39.15
1917.....	30.50	31.75	36.90	41.75	43.35	47.50	54.35	53.40	47.80	34.00	34.00	34.00
1916.....	19.75	20.00	20.00	20.75	20.50	19.75	19.75	19.75	19.75	20.50	25.25	30.00
1915.....	14.25	14.25	14.25	14.25	14.00	14.25	14.50	15.25	16.25	16.50	17.50	19.25
1914.....	14.75	15.00	15.00	15.00	14.75	14.75	14.75	14.75	14.75	14.50	14.25	14.25
1913.....	18.25	18.00	17.75	17.50	17.00	16.25	15.50	15.75	16.00	15.75	15.50	15.00
1912.....	15.00	15.00	15.00	15.25	15.25	15.50	15.75	16.00	16.50	17.50	18.00	18.25
1911.....	15.50	15.50	15.75	15.50	15.25	15.00	15.00	15.00	15.00	15.00	14.85	14.75
1910.....	19.00	18.40	18.25	17.75	17.25	16.75	16.00	16.00	16.00	15.75	15.50	15.50

Lake Superior Charcoal, Delivered, Chicago, 1907-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04	$27.04
1928.....	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1927.....	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04	27.04
1926.....	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	27.04	27.04	27.04
1925.....	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04
1924.....	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04	29.04
1923.....	33.15	33.53	35.53	36.55	36.55	36.65	36.62	32.10	32.04	30.04	28.65	29.04
1922.....	31.50	30.50	26.90	26.50	28.40	30.00	31.65	33.75	36.15	36.15	36.15	36.15
1921.....	40.25	38.50	38.50	38.50	38.50	38.50	36.87	34.30	33.25	32.50	32.25	31.50
1920.....	48.75	55.65	57.50	57.50	57.50	57.50	57.50	57.60	58.30	58.50	58.50	53.50
1919.....	38.70	38.70	38.70	33.25	31.75	31.75	31.75	32.75	32.75	33.15	35.50	41.00
1918.....	37.50	37.50	37.50	37.50	37.50	37.50	37.70	37.70	37.70	37.70	38.70	38.70
1917.....	33.75	34.50	37.55	42.25	49.25	51.80	59.50	59.50	59.50	48.50	37.50	37.50
1916.....	19.25	19.50	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.35	21.95	31.75
1915.....	15.75	15.75	15.75	15.75	15.25	15.25	15.75	15.75	15.95	16.25	17.50	19.25
1914.....	15.50	15.50	15.50	15.50	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75
1913.....	18.25	18.00	18.00	18.00	18.00	16.75	16.75	15.00	15.00	15.75	15.50	15.50
1912.....	16.50	16.50	16.50	15.50	15.75	15.75	16.25	16.75	17.75	18.75	18.75	18.75
1911.....	17.50	17.50	17.50	17.50	17.00	17.00	17.00	17.00	17.00	17.00	16.50	16.50
1910.....	19.50	19.50	19.00	19.00	19.00	18.50	18.50	18.50	18.50	18.00	18.00	17.50
1909.....	19.50	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70
1908.....	22.80	21.50	21.50	21.10	19.85	19.50	19.50	19.50	19.50	19.50	19.50	19.50
1907.....	25.50	26.75	25.50	26.00	27.10	27.40	27.10	27.00	26.75	26.10	25.25	23.50

Market History—

Basic, Delivered Eastern Pennsylvania, 1909-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$20.15	$20.50	$20.25	$20.25	$20.50	$20.25	$19.85	$19.85	$19.85	$19.75	$19.75	$19.75
1928.....	19.50	19.50	19.50	19.25	19.10	19.10	19.00	19.00	19.00	19.75	19.75	19.75
1927.....	21.25	21.00	21.00	20.90	20.75	20.75	20.50	19.75	19.75	19.50	19.50	19.25
1926.....	22.75	22.50	22.20	21.76	21.76	21.76	21.00	21.00	20.76	21.00	22.50	22.75
1925.....	24.25	24.20	24.05	22.65	21.45	21.50	21.50	20.55	20.50	20.50	22.70	23.00
1924.....	22.50	22.50	21.50	21.35	20.75	20.60	20.50	20.00	20.00	20.00	21.46	22.50
1923.....	27.70	28.15	29.35	30.75	30.75	28.15	27.25	25.10	25.10	24.00	22.60	23.30
1922.....	20.25	19.85	19.90	21.70	24.55	25.25	26.00	29.50	30.00	30.25	28.00	27.65
1921.....	33.35	29.95	26.20	25.00	25.00	24.70	22.25	20.70	19.50	20.50	20.90	20.25
1920.....	39.75	40.50	43.00	43.70	44.00	44.05	44.10	47.45	51.15	50.75	44.55	34.75
1919.....	33.90	33.90	32.85	29.65	28.80	25.50	26.60	27.00	27.00	27.90	33.00	35.75
1918.....	33.90	33.90	33.90	32.90	32.90	32.90	32.90	32.90	32.90	36.60	36.90	36.90
1917.....	30.15	30.50	33.80	38.25	40.80	46.40	50.75	51.00	46.50	33.50	33.50	33.50
1916.....	19.50	19.50	20.00	20.50	20.00	19.25	19.00	19.25	20.00	21.00	25.50	30.50
1915.....	13.50	13.75	14.00	13.25	13.50	13.50	13.75	15.25	17.25	17.50	17.75	18.00
1914.....	14.00	14.25	14.25	14.25	14.00	14.00	14.00	14.00	14.00	14.00	13.50	13.50
1913.....	18.25	18.00	17.50	16.50	16.50	16.00	15.25	15.00	15.25	15.25	15.00	14.25
1912.....	14.25	14.25	14.25	15.00	15.00	15.25	15.50	16.25	16.50	17.50	18.00	18.25
1911.....	14.50	15.00	15.25	15.25	14.75	14.50	14.50	14.50	14.50	14.50	14.25	14.25
1910.....	18.75	18.50	18.00	17.50	16.25	15.75	15.50	15.00	15.00	14.50	14.50	14.50
1909.....	16.40	16.10	15.85	15.05	15.00	15.85	15.90	16.15	16.80	17.85	18.36	18.15

Southern Ohio No. 2, f.o.b. Ironton, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1929.....	$18.50	$18.50	(Production discontinued in this district).									
1928.....	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	18.60	18.20	18.50
1927.....	19.90	20.00	20.00	20.00	20.00	19.80	19.00	19.00	19.00	19.00	19.00	19.00
1926.....	21.40	20.60	21.00	20.40	20.00	19.50	19.50	19.90	20.00	20.00	20.00	20.00
1925.....	22.00	22.00	21.60	21.00	19.50	18.75	19.00	19.35	19.50	19.60	21.00	21.00
1924.....	22.90	24.00	23.50	23.00	22.50	20.25	19.50	19.75	20.00	20.00	20.90	22.00
1923.....	27.90	28.40	30.75	31.00	31.00	28.25	26.50	26.00	24.90	23.90	22.50	22.50
1922.....	19.60	19.15	19.00	20.30	22.70	23.25	24.15	27.00	33.75	32.40	29.25	27.00
1921.....	34.60	30.00	27.50	25.85	24.50	22.80	20.50	20.15	20.30	21.00	20.50	20.00
1920.....	39.50	43.00	43.25	43.25	44.00	44.00	44.00	46.50	46.80	46.00	44.00	37.25
1919.....	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	28.80	31.75	36.55
1918.....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917.....	30.00	30.75	35.80	37.75	41.20	47.50	54.50	55.00	49.25	33.00	33.00	33.00
1916.....	18.30	18.50	18.30	18.50	18.50	18.15	18.45	18.40	18.15	19.40	24.00	30.00
1915.....	12.75	12.75	12.75	12.75	12.56	12.50	12.60	13.65	14.20	14.90	16.15	17.00
1914.....	13.00	13.00	13.25	13.50	13.50	13.50	13.00	13.50	13.00	13.00	12.65	12.65
1913.....	17.90	17.50	17.20	16.85	16.20	15.90	15.40	15.20	15.20	14.75	14.70	13.50

Standard Low Phosphorus, Del. Eastern Pennsylvania, 1911-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$24.26	$24.26	$24.26	$24.26	$24.26	$24.26	$24.26	$24.26	$24.76	$24.76	$24.76	$24.76
1928.....	24.76	24.76	24.76	24.76	24.76	24.51	24.51	24.51	24.26	24.26	24.26	24.26
1927.....	25.76	25.76	25.76	25.76	25.76	25.76	25.76	25.26	25.26	25.26	24.76	24.76
1926.....	24.76	24.76	24.76	24.76	24.76	24.26	24.26	24.26	24.51	24.76	25.76	25.76
1925.....	26.76	26.76	26.76	26.26	25.26	25.26	25.26	25.26	24.01	24.51	24.76	24.76
1924.....	27.76	27.76	26.76	27.86	27.26	27.26	27.26	26.26	26.26	26.26	26.76	29.79
1923.....	29.75	31.35	35.45	35.45	35.80	34.80	33.80	32.80	30.50	30.50	30.00	29.76
1922.....	35.00	34.00	34.00	34.00	35.35	35.35	35.15	38.00	40.00	40.00	40.00	40.00
1921.....	47.70	46.80	46.80	44.15	43.30	43.30	43.30	43.30	43.30	43.30	43.30	35.30
1920.....	51.60	53.55	53.80	53.80	54.80	60.20	57.80	59.60	65.30	65.30	*65.30	*65.30
1919.....	51.00	51.00	49.90	46.75	45.80	42.25	41.10	40.25	40.25	40.35	43.00	47.50
1918.....	55.50	55.50	55.50	55.50	55.50	55.50	56.00	56.00	56.00	57.00	57.00	57.00
1917.....	54.50	57.50	66.70	75.50	77.00	85.00	92.50	92.50	82.00	55.50	55.50	55.50
1916.....	32.00	32.00	32.00	33.00	34.00	34.00	33.00	33.00	34.00	40.00	46.00	55.00
1915.....	19.00	19.00	20.00	20.00	20.00	20.50	21.50	23.50	24.50	28.00	30.00	32.00
1914.....	21.00	21.00	21.00	21.00	21.00	20.50	20.50	21.00	21.00	21.00	19.00	19.00
1913.....	24.50	24.50	24.00	23.50	23.50	23.50	23.50	23.00	23.00	23.00	21.50	21.00
1912.....	19.25	19.00	19.00	19.50	19.75	19.75	20.00	21.00	21.50	22.50	24.00	24.50
1911.....	21.50	21.00	21.00	21.00	21.00	20.50	20.50	20.50	20.50	20.25	19.50	19.25

*Nominal.

No. 2X, f.o.b. Virginia Furnace, 1911-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$21.25	$21.25	$21.00	$20.75	$20.75	$20.00	$20.00	$20.00	$20.00	$19.65	$18.25	$18.25
1928.....	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	21.25
1927.....	21.75	22.00	22.00	22.00	22.00	22.00	22.00	21.50	21.50	21.50	21.25	21.00
1926.....	23.50	23.25	23.25	23.25	23.00	23.00	22.75	22.75	23.00	22.50	22.75	23.00
1925.....	24.50	24.50	24.50	23.90	23.35	23.00	23.00	23.00	23.00	23.00	23.00	23.30
1924.....	25.00	25.75	26.00	25.50	25.50	25.50	24.50	24.50	24.50	24.50	24.50	25.00
1923.....	27.50	27.50	28.25	29.25	28.60	28.00	27.25	26.25	25.50	25.00	25.00	24.50
1922.....	21.75	22.00	22.50	22.85	23.50	24.50	26.00	26.00	33.00	33.00	31.40	27.75
1921.....	34.50	31.25	28.05	27.10	27.00	26.00	24.50	24.00	23.00	23.25	22.80	22.50
1920.....	41.25	42.75	43.25	44.25	45.75	46.25	46.75	49.25	50.25	49.75	45.75	42.05
1919.....	35.25	33.00	31.55	28.45	27.50	26.50	26.50	28.25	29.25	30.35	33.40	38.25
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	37.50	38.00	38.00
1917.....	26.50	28.25	34.25	38.30	41.00	46.50	52.25	51.90	46.50	33.50	33.50	33.50
1916.....	17.25	18.00	18.25	18.50	18.50	18.50	18.50	18.50	17.50	18.50	23.75	27.00
1915.....	12.50	12.50	12.50	12.50	12.50	12.50	12.50	13.00	13.50	14.00	15.50	17.00
1914.....	12.75	12.75	12.75	12.75	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
1913.....	16.00	15.50	15.50	15.00	14.50	13.75	13.00	13.00	13.00	13.00	13.00	12.75
1912.....	12.25	12.25	12.25	13.00	13.00	13.25	13.50	14.00	14.50	15.50	16.00	16.00
1911.....	12.75	12.75	13.00	13.00	13.00	12.25	12.25	12.25	12.25	12.25	12.25	12.25

Market History—

No. 2X Foundry, f.o.b. Buffalo, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$19.00	$19.00	$19.25	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00
1928.....	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	18.00	19.00	19.00
1927.....	19.75	18.90	18.15	18.00	18.00	17.90	17.50	17.45	18.00	18.00	17.60	17.50
1926.....	21.50	21.50	21.50	21.50	21.25	20.50	19.80	20.00	20.00	20.00	20.00	20.00
1925.....	23.50	22.75	22.50	20.90	19.25	19.00	19.00	19.00	19.00	19.50	21.25	21.50
1924.....	23.10	22.75	22.00	21.50	20.50	19.90	19.30	19.10	19.50	19.60	20.90	22.00
1923.....	28.00	28.50	29.40	30.10	29.80	29.50	26.60	25.50	25.25	23.00	20.70	22.00
1922.....	19.80	19.15	18.30	20.75	23.00	23.85	25.35	31.50	33.75	31.50	27.85	26.00
1921.....	33.75	31.25	28.25	26.75	26.25	23.85	21.75	21.25	21.05	20.40	20.00	20.00
1920.....	41.50	44.60	45.15	46.25	46.25	46.25	46.25	48.75	51.25	51.25	46.00	48.25
1919.....	32.25	32.25	31.45	28.00	28.00	28.00	28.00	28.70	28.75	29.90	34.45	39.50
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917.....	35.00	35.00	38.15	40.00	42.75	49.15	53.50	54.00	49.05	33.50	33.50	33.50
1916.....	18.50	18.60	18.85	19.15	19.00	18.75	18.75	18.75	18.90	20.70	26.65	33.65
1915.....	13.15	13.05	12.55	12.75	12.75	12.75	12.80	13.70	15.15	15.80	16.70	18.00
1914.....	13.00	13.00	13.75	13.90	13.50	13.05	13.05	13.20	13.25	12.60	12.45	13.10
1913.....	17.25	17.00	17.00	16.50	15.50	14.75	14.00	14.00	14.25	14.00	14.00	14.00

Semifinished Material

Per Gross Ton f.o.b.

Bessemer Billets, Pittsburgh, 1895-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$33.00	$34.25	$34.00	$34.50	$36.00	$35.75	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00
1928.....	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00
1927.....	35.00	34.00	33.60	33.50	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
1926.....	35.50	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1925.....	37.40	37.60	37.75	35.80	35.35	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1924.....	40.00	40.00	40.00	40.00	39.20	38.00	38.00	38.00	37.10	36.60	35.50	35.50
1923.....	37.50	38.85	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	39.00	29.00
1920.....	49.60	61.25	65.00	68.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	62.50	64.85	69.30	75.20	88.65	95.60	102.25	92.25	74.05	58.75	47.50	47.50
1916.....	34.05	35.50	41.10	46.25	46.10	43.00	42.50	45.15	47.50	48.10	53.10	59.50
1915.....	19.75	20.00	20.00	20.00	20.05	20.35	21.45	23.00	24.70	25.20	27.10	30.75
1914.....	20.00	20.90	21.05	21.05	20.00	19.80	19.55	20.05	21.00	20.40	19.25	18.85
1913.....	28.90	28.90	29.00	29.00	27.80	26.75	26.75	26.30	25.00	23.00	21.10	20.10
1912.....	20.00	20.00	19.90	20.00	21.10	21.90	22.25	22.40	23.75	25.70	26.75	27.00
1911.....	23.00	23.00	23.00	23.00	23.00	21.00	21.00	21.00	21.00	20.00	19.70	19.25
1910.....	27.87	27.50	27.50	27.00	26.10	25.50	25.00	25.00	24.50	23.40	23.00	23.00
1909.....	25.00	23.50	23.00	22.00	22.50	23.00	24.00	25.00	26.00	26.50	27.50	27.50
1908.....	28.00	28.00	28.00	28.00	28.00	26.50	25.00	25.00	25.00	25.00	25.00	25.00
1907.....	29.75	29.50	29.25	29.75	30.25	31.00	30.00	30.00	29.50	28.50	28.00	28.00
1906.....	27.00	27.50	27.65	27.75	27.00	26.25	27.00	28.00	28.50	28.50	29.00	29.75
1905.....	21.00	24.90	24.60	25.50	23.50	22.00	22.00	23.50	25.75	25.95	26.30	26.50
1904.....	23.00	23.00	23.00	23.00	22.00	21.50	21.00	20.00	19.50	19.50	21.00	21.00
1903.....	29.75	30.00	30.25	31.00	30.50	29.50	27.50	27.00	27.00	26.50	23.50	23.00
1902.....	28.05	29.80	31.35	32.25	33.90	35.20	33.50	32.10	31.50	29.80	29.00	29.25
1901.....	19.70	19.75	20.80	24.10	24.20	24.45	24.25	24.40	24.10	26.80	28.25	27.60
1900.....	35.00	35.00	35.00	34.50	29.00	27.25	22.50	18.00	17.50	17.50	19.30	19.75
1899.....	16.75	18.25	24.00	25.50	27.00	31.50	33.50	36.50	39.00	37.50	36.00	35.00
1898.....	15.00	15.00	15.25	15.25	14.85	14.75	14.75	15.45	16.10	15.75	15.25	16.00
1897.....	15.25	15.50	15.50	14.75	14.00	14.25	14.00	14.15	15.75	16.50	15.75	15.00
1896.....	17.05	17.65	17.50	18.90	19.50	19.75	19.90	91.75	19.60	20.25	20.00	17.00
1895.....	14.85	15.00	14.85	15.40	16.75	18.75	20.85	22.00	24.25	22.00	19.50	17.00

Wire Rods, Pittsburgh, 1912-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$40.00	$40.00
1928.....	41.50	43.50	44.00	44.00	44.00	44.00	42.00	42.00	42.00	42.00	42.00	42.00
1927.....	45.00	43.50	43.00	42.50	42.00	42.00	43.00	43.00	43.00	42.50	41.00	40.00
1926.....	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
1925.....	48.00	48.00	48.00	47.75	46.00	45.25	45.00	45.00	45.00	45.00	45.00	45.30
1924.....	51.00	51.00	51.00	51.00	48.40	48.00	48.00	46.00	45.75	45.00	45.50	48.00
1923.....	45.00	47.50	47.00	46.60	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1922.....	37.00	35.75	35.80	38.00	38.00	38.00	39.50	40.00	45.00	45.00	46.50	46.50
1921.....	57.00	57.00	52.00	50.00	48.00	47.00	42.25	42.00	40.80	40.00	38.00	38.00
1920.....	52.00	56.00	62.50	70.00	70.00	70.00	70.00	70.00	70.00	75.00	72.50	57.00
1919.....	57.00	57.00	55.75	52.00	52.00	52.00	52.00	52.00	52.00	52.00	56.00	62.00
1918.....	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.25	57.50	57.50	57.50
1917.....	73.75	75.00	75.00	83.75	88.00	92.50	95.00	96.00	90.00	73.50	57.00	57.00
1916.....	46.25	50.00	51.00	55.00	60.00	60.00	58.75	55.00	55.00	55.00	64.00	69.00
1915.....	25.00	25.00	25.00	25.00	25.00	25.00	25.60	26.75	28.50	30.00	34.50	39.00
1914.....	25.50	25.90	26.00	26.00	26.00	25.50	24.80	24.50	25.60	26.00	25.75	25.00
1913.....	30.00	30.00	30.00	30.00	30.00	29.50	28.60	27.60	27.50	26.80	26.00	25.75
1912.....	24.65	25.30	25.50	25.50	25.90	25.35	25.65	26.00	26.25	27.80	29.60	30.00

Open-Hearth Sheet Bars, Pittsburgh, 1913-1929

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1929.....	$34.00	$33.25	$35.00	$35.25	$36.00	$35.75	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00
1928.....	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00
1927.....	36.00	35.00	34.00	33.75	33.75	33.50	33.50	33.50	33.90	34.00	34.00	34.00
1926.....	36.50	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
1925.....	39.25	39.00	38.25	37.00	36.25	35.00	35.00	35.00	35.00	35.00	35.00	36.80
1924.....	42.50	42.50	42.50	42.10	40.60	40.00	39.20	38.00	37.50	37.20	37.00	37.00
1923.....	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
1922.....	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921.....	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920.....	53.40	65.00	72.50	78.00	78.75	75.00	75.00	71.25	68.50	63.75	56.25	47.65
1919.....	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918.....	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1917.....	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	51.00
1916.....	34.75	35.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915.....	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914.....	20.60	21.75	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913.....	29.20	29.90	30.00	30.00	28.80	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Market History—

Open-Hearth Billets, Pittsburgh, 1910-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$33.00	$34.25	$34.00	$34.50	$36.00	$35.75	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00
1928.....	33.00	33.00	33.00	33.00	33.00	32.50	32.25	32.00	32.00	32.75	33.00	33.00
1927.....	35.00	34.00	33.60	33.50	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00
1926.....	35.50	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
1925.....	37.75	37.65	37.75	35.80	35.40	33.90	35.00	35.00	35.00	35.00	35.00	35.00
1924.....	40.00	40.00	40.00	40.00	39.20	38.00	38.00	38.00	37.10	36.60	35.50	35.50
1923.....	37.50	38.85	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	29.00	29.00
1920.....	49.60	61.25	66.25	70.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	60.00	62.50	67.00	72.50	85.00	93.75	100.00	93.00	73.75	58.75	47.50	47.50
1916.....	34.75	35.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	58.75
1915.....	19.50	19.50	19.50	19.50	19.50	19.85	21.50	24.00	25.60	26.50	28.00	30.20
1914.....	20.00	20.75	21.00	20.80	20.00	19.75	19.30	20.00	21.00	20.60	19.00	18.50
1913.....	28.70	29.40	29.50	29.50	28.10	26.50	26.50	26.10	25.00	23.00	20.85	20.00
1912.....	19.75	19.50	19.40	20.25	21.00	21.25	21.75	21.75	21.75	21.75	21.75	28.00
1911.....	23.00	23.00	23.00	23.00	22.00	21.00	21.00	21.00	20.25	19.50	19.75	19.25
1910.....	28.00	28.00	28.50	28.75	28.75	27.00	26.50	26.00	25.00	24.00	23.25	23.00

Bessemer Sheet Bars, Pittsburgh, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$34.00	$33.25	$35.00	$35.25	$36.00	$35.75	$35.00	$35.00	$35.00	$35.00	$35.00	$35.00
1928.....	34.00	34.00	33.70	34.00	34.00	33.50	32.25	32.20	33.00	33.00	33.60	34.00
1927.....	36.00	35.00	34.00	33.75	33.75	33.50	33.50	33.50	33.90	34.00	34.00	34.00
1926.....	36.50	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
1925.....	39.20	39.00	38.50	37.00	36.25	35.00	35.00	35.00	35.00	35.00	35.00	36.80
1924.....	42.50	42.50	42.50	42.10	40.60	40.00	39.20	38.00	37.50	37.20	37.00	37.00
1923.....	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
1922.....	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921.....	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920.....	53.40	65.00	70.00	70.00	75.00	70.00	70.00	70.00	68.50	63.75	56.25	47.65
1919.....	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918.....	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00
1917.....	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	57.00
1916.....	33.75	34.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915.....	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914.....	21.00	22.00	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913.....	28.70	29.40	29.50	29.50	28.40	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Beehive Coke

Per Net Ton

Furnace, Spot, Connellsville, 1914-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$2.75	$2.90	$2.95	$2.75	$2.75	$2.75	$2.75	$2.75	$2.65	$2.65	$2.65	$2.65
1928.....	2.70	2.65	2.60	2.60	2.55	2.60	2.60	2.75	2.75	2.80	2.75	2.75
1927.....	3.35	3.35	3.30	3.20	2.80	2.85	2.90	3.00	2.85	2.85	2.80	2.65
1926.....	6.90	7.45	3.15	3.05	2.85	2.70	2.65	2.85	3.25	3.65	4.75	3.65
1925.....	4.10	3.65	3.35	3.10	3.10	2.80	2.80	3.10	3.45	5.65	6.35	3.90
1924.....	3.80	4.00	4.05	3.55	3.25	3.15	2.85	3.00	3.00	3.00	3.00	3.35
1923.....	8.25	7.20	7.15	6.25	5.10	4.65	4.35	4.45	4.55	3.85	3.80	4.20
1922.....	2.75	2.95	3.25	4.30	6.00	6.60	10.65	13.20	11.00	10.60	7.10	6.25
1921.....	5.15	4.85	4.55	3.60	3.25	3.15	2.75	2.85	3.15	3.25	3.15	2.95
1920.....	6.00	6.00	6.00	11.20	12.00	14.50	15.20	17.75	16.90	15.15	8.40	6.25
1919.....	5.85	4.40	4.30	4.05	3.95	4.10	4.25	4.60	4.95	4.35	5.75	6.20
1918.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1917.....	9.05	11.20	9.40	7.60	8.35	11.40	12.10	13.70	12.10	6.00	6.00	6.00
1916.....	2.50	3.00	3.00	2.25	2.25	2.55	2.70	2.75	2.95	5.30	7.05	8.25
1915.....	1.60	1.55	1.50	1.50	1.55	1.55	1.70	1.50	1.60	1.70	2.10	2.10
1914.....	1.80	1.80	1.95	1.90	1.75	1.75	1.75	1.75	1.65	1.65	1.60	1.60

Foundry, Spot, Connellsville 1900-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.55	$3.50
1928.....	3.75	3.75	3.75	3.65	3.55	3.50	3.50	3.75	3.75	3.75	3.75	3.75
1927.....	4.25	3.85	4.15	4.05	3.80	3.90	4.00	4.00	4.00	3.75	3.75	3.65
1926.....	6.40	6.50	4.45	4.10	3.85	3.75	3.70	3.60	4.15	4.65	5.85	4.75
1925.....	5.10	4.30	3.85	3.85	3.70	3.75	3.75	3.80	4.20	5.95	6.85	5.30
1924.....	4.35	4.80	4.85	4.60	4.30	4.15	4.05	4.00	4.00	4.00	4.05	4.25
1923.....	9.00	8.60	8.15	7.80	6.10	5.50	5.15	5.20	5.70	4.80	4.85	5.15
1922.....	3.85	3.80	4.05	4.95	6.50	7.20	11.40	14.30	12.75	12.10	8.40	7.50
1921.....	6.50	6.30	6.05	5.00	4.85	4.50	4.45	4.00	4.30	4.50	4.30	4.15
1920.....	7.00	7.00	7.00	11.60	12.50	15.00	16.00	18.25	17.90	16.85	9.40	7.25
1919.....	7.05	5.15	4.80	4.55	4.35	4.70	4.80	5.20	5.90	5.60	6.95	7.15
1918.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1917.....	10.40	10.90	11.30	9.65	9.65	11.20	15.00	12.70	13.35	7.00	7.00	7.00
1916.....	3.75	3.75	3.60	3.85	3.10	3.00	3.00	3.05	3.25	4.35	8.60	9.25
1915.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.25	2.30	2.95	3.15
1914.....	2.50	2.40	2.40	2.40	2.40	2.35	2.30	2.25	2.25	2.20	2.10	2.00
1913.....	4.45	3.70	3.50	3.05	2.90	2.85	2.85	2.85	2.85	2.75	2.50	2.50
1912.....	2.05	2.20	2.65	2.75	2.60	2.55	2.45	2.60	2.65	3.35	4.40	4.50
1911.....	1.95	1.95	2.00	2.00	1.90	1.75	1.80	1.85	1.85	1.85	1.90	1.90
1910.....	3.00	2.90	2.80	2.55	2.30	2.15	2.10	2.15	2.10	2.05	2.00	2.00
1909.....	1.70	1.60	1.55	1.50	1.45	1.50	1.50	1.65	2.30	2.75	2.80	2.75
1908.....	1.80	1.75	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.70	1.75	1.80
1907.....	3.75	3.55	3.00	2.70	2.15	2.05	2.40	2.60	2.80	2.90	2.40	2.00
1906.....	3.00	2.40	2.35	2.60	2.55	2.40	2.55	2.70	2.75	2.85	3.20	3.60
1905.....	2.80	2.50	2.50	2.00	1.90	1.85	1.80	1.85	2.00	2.70	3.00	2.85
1904.....	1.45	1.50	1.55	1.50	1.45	1.40	1.40	1.40	1.40	1.45	1.85	2.15
1903.....	4.50	4.50	4.00	3.75	3.50	3.00	2.50	2.00	2.00	1.90	1.90	1.75
1902.....	2.25	2.25	2.50	2.50	2.50	2.50	2.50	3.25	4.00	5.00	5.00	5.00
1901.....	1.75	1.75	2.00	2.00	2.00	1.85	1.75	1.75	1.75	2.00	2.00	2.00
1900.....	3.00	3.50	4.00	3.75	3.00	2.50	2.00	1.75	1.75	1.75	1.75	1.75

By-Product Foundry Coke

Per Net Ton

Newark, Delivered, 1921-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00
1928.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1927.....	9.84	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59	9.59
1926.....	11.01	11.01	11.01	9.59	9.59	9.59	9.59	9.59	9.59	9.59	10.59	10.59
1925.....	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.71	11.04	11.52
1924.....	10.91	10.91	10.91	10.81	10.41	10.41	10.41	10.41	10.41	10.41	10.41	10.41
1923.....	12.84	12.84	12.84	12.84	12.34	11.84	11.34	11.34	11.34	11.41	10.91	10.91
1922.....	8.59	8.59	8.59	8.84	9.49	10.34	11.47	14.04	14.84	14.84	13.28	12.84
1921.....	.....	.....	.....	.....	.....	.....	8.84	8.84	8.84	8.84	8.84	8.84

St. Louis, Ovens, 1921-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00
1928.....	9.75	9.75	9.75	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
1927.....	10.50	10.50	10.50	*9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75
1926.....	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.25	10.50
1925.....	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.15	9.50	9.80	10.00	10.00
1924.....	12.50	12.50	12.50	12.00	12.00	10.60	9.20	9.00	9.00	9.00	9.00	9.00
1923.....	14.00	14.25	14.20	14.00	14.00	14.00	14.00	13.00	13.00	13.00	13.00	13.00
1922.....	9.50	9.50	9.30	9.00	9.00	9.00	9.00	11.40	13.00	14.00	14.00	14.00
1921.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.50

*Granite City previous to April, 1927.

Boston, Delivered, 1921-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00	$11.00
1928.....	11.50	11.50	11.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1927.....	13.50	12.65	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
1926.....	13.00	13.00	13.00	12.50	12.50	12.00	12.00	12.00	12.00	12.00	13.00	13.50
1925.....	11.50	12.00	12.00	12.00	12.00	11.50	11.50	11.65	12.00	12.00	12.90	13.00
1924.....	12.50	12.50	12.50	12.00	12.00	11.30	*11.80	11.50	11.50	11.50	11.50	11.50
1923.....	16.00	16.00	16.00	16.00	16.00	15.50	13.50	13.50	13.50	13.50	12.50	12.50
1922.....	10.40	10.25	10.15	10.15	10.15	10.15	14.00	16.30	16.50	16.50	16.20	16.00
1921.....	.....	.....	.....	.....	.....	.....	.....	.....	10.66	10.66	10.66	10.66

*From this point forward—New England delivered.

Chicago, Ovens, 1921-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00	$8.00
1928.....	9.00	9.00	9.00	9.00	9.00	8.50	8.00	8.00	8.00	8.00	8.00	8.00
1927.....	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.30	9.00
1926.....	10.50	10.50	10.50	9.95	9.75	9.75	9.75	9.75	9.75	9.75	9.75	10.25
1925.....	10.75	10.75	10.75	10.75	10.75	10.75	9.75	9.75	9.75	10.25	10.45	10.50
1924.....	12.50	12.50	12.50	12.50	12.50	12.50	11.45	10.75	10.75	10.75	10.75	10.75
1923.....	15.00	15.00	15.00	15.00	15.00	15.00	13.50	13.50	13.50	13.50	12.50	12.50
1922.....	11.25	11.25	11.25	11.25	11.25	11.25	11.25	12.60	13.50	13.50	14.70	15.00
1921.....	.....	.....	.....	.....	.....	.....	11.25	11.25	11.25	11.25	11.25	11.25

Birmingham, Ovens, 1925-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
1928.....	5.00	5.00	5.00	3.95	4.80	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1927.....	5.15	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.25	5.00
1926.....	5.60	5.50	5.50	5.15	5.15	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1925.....	.....	4.90	5.00	5.00	4.65	4.50	4.50	4.50	4.60	4.75	5.70	5.70

Iron and Steel Scrap

Per Gross Ton Delivered

Low Phosphorus Scrap, Pittsburgh, 1917-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$22.00	$22.50	$22.35	$23.25	$22.40	$22.25	$22.50	$22.80	$23.00	$22.20	$21.75	$20.75
1928.....	18.85	18.50	18.20	18.35	18.50	18.50	18.50	19.00	20.00	20.75	21.00	21.00
1927.....	20.25	19.50	20.00	20.50	19.10	19.10	19.00	19.00	20.00	19.50	18.60	18.50
1926.....	24.00	22.00	21.50	20.90	19.50	19.75	20.30	21.75	21.60	20.25	20.40	20.30
1925.....	26.20	25.35	23.85	21.60	21.75	22.40	22.50	22.50	23.00	23.40	24.00	24.00
1924.....	23.90	24.25	23.75	20.60	19.30	21.40	21.70	22.00	22.25	22.30	23.50	25.00
1923.....	25.15	27.00	31.30	32.10	28.30	25.00	23.15	22.70	23.50	22.50	20.70	22.50
1922.....	17.50	17.10	17.10	18.60	20.00	20.60	21.00	20.60	22.90	24.85	25.00	24.50
1921.....	24.50	22.00	21.20	18.25	18.00	17.00	15.25	15.50	16.30	18.00	17.65	17.25
1920.....	31.50	33.00	32.60	30.60	30.00	30.75	30.00	33.15	34.00	33.75	31.00	25.50
1919.....	29.40	24.25	22.50	22.40	22.00	21.25	23.00	24.00	24.00	24.00	25.75	27.50
1918.....	42.20	40.00	40.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	38.60	38.50
1917.....	32.00	30.00	33.00	34.25	36.60	43.50	52.75	43.00	47.25	43.50	39.00	39.00

Market History—

No. 1 Cast, Pittsburgh, 1917-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$15.30	$14.50	$15.20	$15.45	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$14.90	$14.75
1928.....	14.50	14.50	14.50	14.75	14.60	14.00	14.00	14.05	14.25	14.55	15.10	14.70
1927.....	16.00	15.60	15.60	16.00	15.75	15.10	15.00	15.00	15.00	14.70	14.50	14.50
1926.....	17.40	16.86	17.00	17.00	16.25	15.85	15.60	16.85	16.40	16.10	16.00	16.00
1925.....	19.50	18.85	18.35	17.80	17.00	17.00	17.00	17.10	17.50	17.40	17.75	17.50
1924.....	21.30	20.85	19.60	18.35	17.50	17.75	17.70	18.00	18.35	17.70	18.25	18.50
1923.....	22.65	24.50	27.70	27.75	25.60	23.75	21.50	21.20	21.50	19.35	18.50	20.00
1922.....	16.00	16.00	16.40	17.25	18.50	18.70	19.15	19.00	21.75	23.35	23.30	22.50
1921.....	24.50	22.00	21.00	18.25	17.50	16.00	15.00	14.85	16.30	17.50	17.10	16.25
1920.....	32.50	41.50	41.00	39.60	39.00	40.00	38.50	41.50	42.20	40.75	38.00	27.50
1919.....	25.60	21.00	21.00	21.75	21.00	21.00	21.00	24.00	24.50	25.00	28.75	30.50
1918.....	28.00	28.00	28.00	34.00	32.50	32.50	32.50	32.50	32.50	32.50	32.40	32.00
1917.....	20.00	19.75	21.50	23.35	24.60	33.25	34.75	35.00	32.50	28.00	28.50	28.50

No. 1 Cast, Eastern Pennsylvania, 1915-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$16.75	$16.75	$16.50	$16.50	$16.50	$16.50	$16.50	$16.50	$16.25	$16.25	$16.00	$16.00
1928.....	16.75	16.75	16.75	16.25	16.25	16.00	16.00	15.75	16.20	17.00	16.50	16.50
1927.....	17.75	17.50	17.50	17.25	17.25	16.75	16.35	16.25	16.25	16.25	16.75	16.75
1926.....	18.35	18.25	18.25	18.25	18.00	17.75	17.80	18.25	18.15	17.75	17.75	17.75
1925.....	20.75	19.35	18.50	18.20	17.10	17.75	17.75	17.75	18.65	18.75	18.75	18.75
1924.....	20.75	20.35	19.25	18.35	17.10	17.90	17.80	18.00	18.40	17.95	18.25	19.50
1923.....	23.30	24.75	28.00	26.85	24.80	22.75	21.00	20.00	20.35	19.70	19.50	20.50
1922.....	16.75	16.50	17.00	17.40	17.90	18.50	18.00	18.00	20.65	23.00	21.90	20.50
1921.....	24.15	23.35	20.50	18.15	17.90	17.50	17.50	16.50	16.50	17.50	18.00	17.50
1920.....	36.50	38.55	40.00	38.00	38.00	37.00	37.20	38.75	39.80	38.00	34.75	28.90
1919.....	28.15	25.00	22.50	22.50	21.50	22.00	23.50	24.65	25.00	25.15	28.00	31.75
1918.....	33.50	34.50	33.90	32.75	33.00	33.75	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	20.75	20.15	22.50	26.75	30.00	34.75	38.35	34.10	32.90	30.00	30.50	32.00
1916.....	17.50	17.50	17.75	18.00	17.75	16.50	16.00	16.00	16.25	16.50	18.50	22.00
1915.....	12.00	12.00	12.50	12.50	12.00	12.25	12.25	13.50	14.50	14.50	15.00	15.60

No. 1 Cast, Chicago, 1918-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$17.70	$17.90	$17.90	$17.90	$17.25	$16.25	$16.25	$16.25	$16.80	$15.65	$15.35	$15.10
1928.....	15.75	15.75	15.65	15.65	15.90	15.95	15.95	15.95	16.30	16.55	16.90	17.35
1927.....	18.90	18.90	18.50	18.10	17.35	16.65	16.55	16.80	16.80	16.25	15.85	15.70
1926.....	19.40	18.75	18.75	18.65	18.05	18.15	19.55	19.00	18.95	17.90	18.35	18.50
1925.....	22.10	20.15	19.70	18.85	19.00	19.50	19.75	20.30	20.15	19.40	20.90	20.50
1924.....	22.10	22.25	20.80	20.00	19.00	17.75	18.60	19.00	20.25	19.20	19.25	20.75
1923.....	24.30	25.75	28.50	27.55	24.20	23.25	23.25	21.20	21.50	20.40	20.55	21.50
1922.....	14.00	14.50	15.10	16.15	17.40	17.30	17.65	19.70	23.80	24.00	22.90	22.00
1921.....	20.35	21.15	18.10	15.25	15.85	14.90	13.75	13.95	14.50	15.25	15.50	14.00
1920.....	42.50	43.25	42.20	44.10	42.50	41.75	41.20	42.00	39.30	32.75	27.65	22.10
1919.....	26.25	22.05	23.10	23.50	22.35	23.40	20.65	27.75	26.75	28.15	31.10	35.35
1918.....	30.00	30.00	33.00	32.45	30.75	31.00	31.80	33.40	34.00	34.00	32.75	29.00

Iron Car Wheels, Chicago, 1915-1929

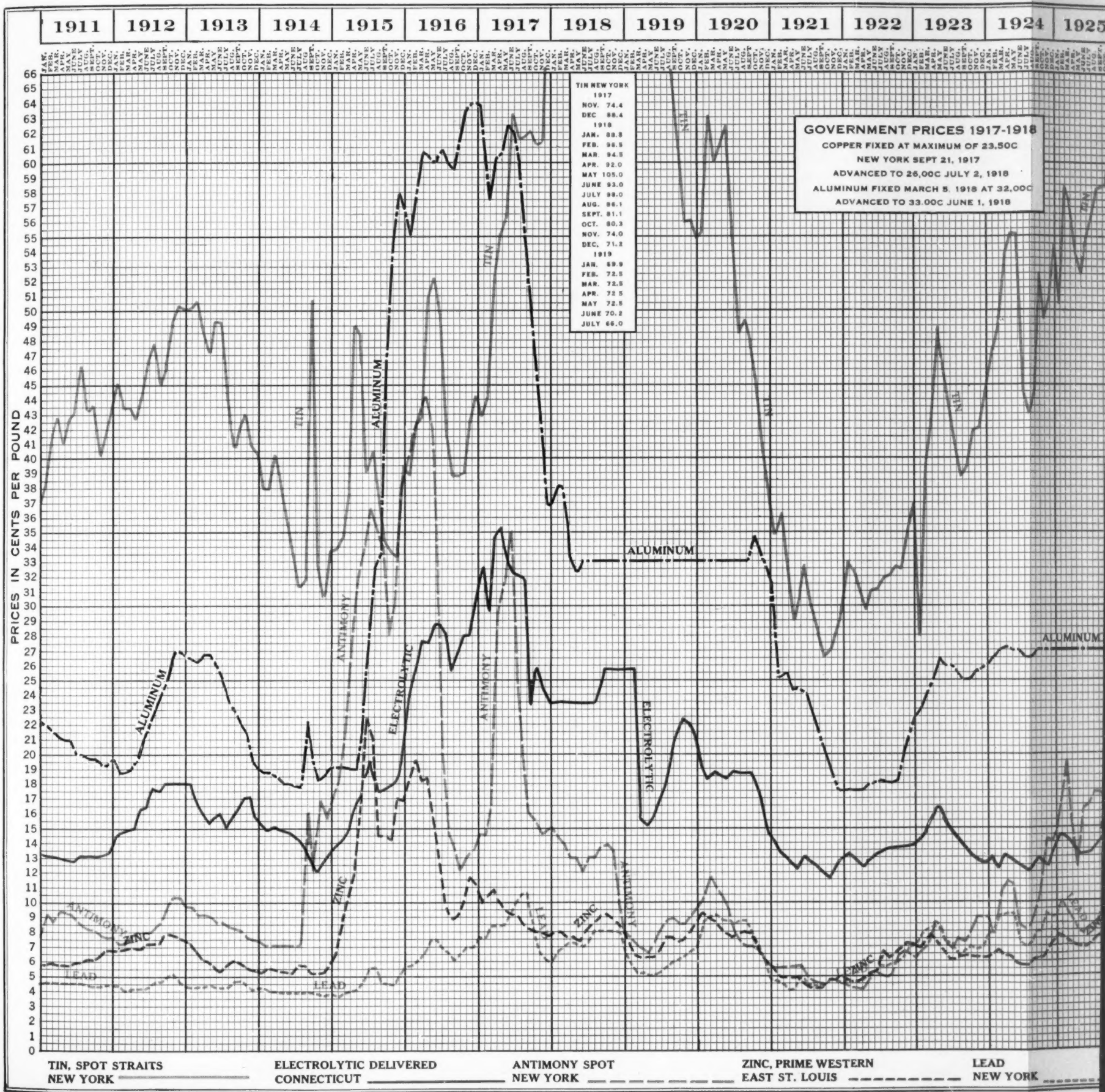
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$14.10	$14.50	$14.50	$14.75	$14.50	$14.20	$13.60	$14.00	$14.00	$14.00	$13.60	$13.65
1928.....	13.70	14.25	13.95	13.50	13.45	13.10	13.00	13.00	13.00	13.10	14.05	14.05
1927.....	14.95	15.10	15.00	14.85	14.00	13.50	13.80	14.75	14.25	13.50	13.15	13.40
1926.....	18.00	16.30	16.70	16.45	15.65	15.40	16.50	16.50	15.75	14.50	14.50	14.60
1925.....	21.00	19.65	17.50	16.85	15.90	17.40	17.15	17.50	17.60	17.25	18.15	18.40
1924.....	20.60	21.25	19.90	17.50	16.60	15.65	16.40	16.90	18.40	17.90	18.60	19.50
1923.....	25.35	26.50	28.50	27.65	24.30	21.50	20.90	19.60	19.60	18.60	17.85	19.00
1922.....	15.25	14.65	15.90	18.15	18.80	18.25	18.90	20.40	23.50	24.75	24.60	23.75
1921.....	21.50	21.40	16.60	14.45	14.50	13.70	12.75	13.70	14.90	16.15	16.25	15.90
1920.....	36.25	38.75	36.15	38.50	38.25	36.00	35.70	38.40	38.80	37.25	33.25	25.80
1919.....	23.20	21.15	20.00	20.40	20.20	22.00	24.50	25.15	23.50	23.60	28.50	29.75
1918.....	30.40	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	27.50
1917.....	19.75	18.30	20.30	23.25	27.20	37.00	36.75	30.70	31.00	25.90	27.50	29.50
1916.....	14.75	14.05	14.05	14.00	13.15	12.50	11.90	12.00	12.25	12.25	15.95	21.00
1915.....	10.00	10.00	10.00	10.00	9.75	9.85	10.30	11.40	11.75	11.75	12.75	14.75

Heavy Melting Steel, Pittsburgh, 1902-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$19.00	$18.60	$18.50	$18.60	$17.85	$18.30	$18.45	$18.90	$18.45	$17.30	$16.30	$15.00
1928.....	15.35	15.05	14.75	14.85	15.00	14.70	14.10	15.00	16.55	17.35	17.35	17.50
1927.....	17.00	16.10	16.40	16.50	15.50	15.10	14.95	15.00	15.00	14.50	14.50	14.60
1926.....	18.75	17.60	17.70	16.90	16.00	15.85	16.70	17.75	17.75	17.00	17.00	16.75
1925.....	22.10	19.00	18.25	17.00	16.60	17.10	17.20	19.25	19.00	18.40	19.50	19.00
1924.....	21.10	21.60	19.75	16.60	15.40	16.25	17.30	17.75	18.60	18.20	19.85	21.00
1923.....	21.65	23.40	26.10	25.85	22.50	20.50	18.25	17.50	18.00	16.10	15.70	18.50
1922.....	14.50	14.70	14.95	16.50	17.00	16.85	16.50	17.10	19.50	21.35	20.30	20.00
1921.....	15.00	15.00	15.00	13.00	13.60	13.10	12.00	12.60	11.30	14.00	14.25	14.25
1920.....	26.50	28.15	28.00	26.40	25.50	25.30	25.70	27.75	28.60	28.00	24.00	18.75
1919.....	20.80	17.00	14.60	15.75	15.55	17.25	19.90	21.25	20.50	20.00	21.90	24.65
1918.....	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1917.....	23.25	21.90	23.40	28.15	28.40	40.00	40.25	36.60	35.50	31.30	29.60	30.00
1916.....	17.50	17.35	17.95	18.10	17.10	16.25	16.25	16.00	16.10	17.80	20.55	26.75
1915.....	11.55	11.60	12.00	11.90	11.75	11.75	11.75	13.38	14.25	14.00	15.30	17.40
1914.....	11.30	12.15	12.40	12.25	12.00	12.00	12.00	11.65	11.65	11.40	10.40	10.45
1913.....	15.15	14.90	14.40	14.40	14.15	13.50	12.75	12.65	12.65	12.65	11.75	11.20
1912.....	12.50	12.65	12.40	13.00	13.40	13.40	13.65	13.55	13.90	14.40	15.30	15.00
1911.....	13.50	14.30	14.40	13.50	12.75	13.15	12.90	13.40	13.15	12.25	12.15	12.50
1910.....	17.90	17.65	17.00	17.00	16.00	15.25	14.50	14.25	14.25	14.40	14.15	13.75
1909.....	16.50	16.00	14.75	14.15	14.95	15.50	15.75	16.00	16.75	17.90	18.15	17.95
1908.....	13.25	13.25	13.50	12.75	12.75	13.00	13.25	14.75	14.75	14.50	14.75	16.25
1907.....	19.25	18.75	18.25	18.25	18.15	18.65	18.50	18.25	17.75	17.50	15.45	13.75
1906.....	17.75	16.65	15.90	14.65	15.25	15.00	15.75	16.00	16.90	16.75	17.25	19.75
1905.....	16.75	16.15	16.50	16.50	15.40	14.50	14.25	14.15	15.40	16.20	17.15	18.25
1904.....	12.65	13.25	13.75	14.15	13.05	11.50	10.75	11.15	11.75	12.00	13.65	14.90
1903.....	22.25	21.75	21.25	22.15	21.65	20.50	20.25	18.75	18.25	16.00	14.50	11.50
1902.....	17.25	17.45	18.55	19.40	20.25	21.40	22.25	21.25	21.25	21.65	21.15	22.25

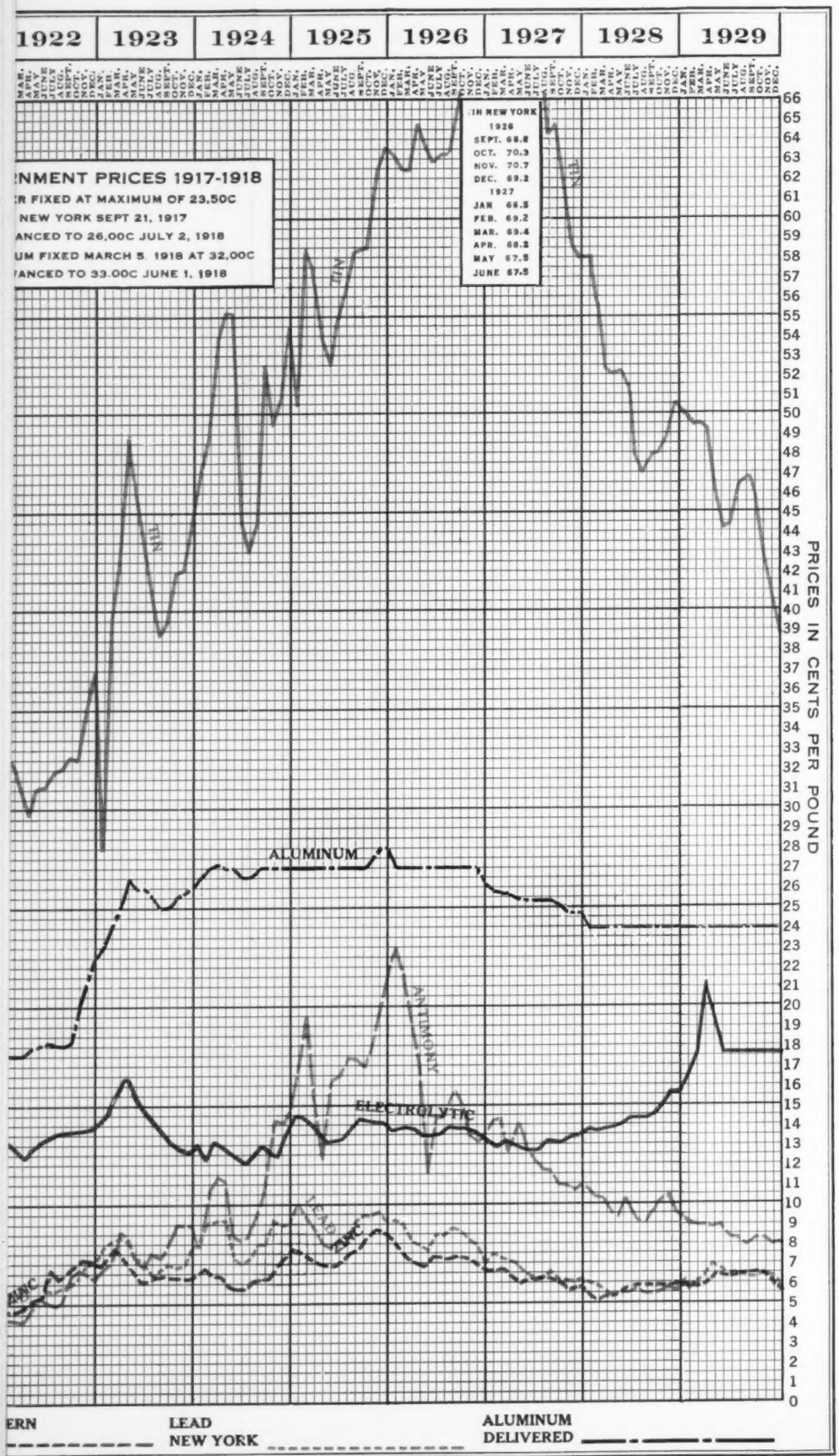
IRON TRADE REVIEW

Fluctuations in prices of pig tin, aluminum, antimony, electrolytic copper, zin



ADE

ctrolytic copper, zinc and lead, 1911-1929



Market History—

Heavy Melting Steel, Detroit, (Dealers), 1926-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$14.20	$14.35	$14.05	$14.25	$13.90	$13.50	$13.75	$14.35	$14.20	$13.40	$12.40	$12.50
1928.....	11.44	11.25	11.05	10.75	11.00	10.88	10.38	10.50	11.69	12.50	13.30	13.50
1927.....	12.50	12.50	12.70	12.88	11.88	11.50	11.56	11.75	11.70	11.50	11.38	11.25
1926.....	14.75	14.75	14.75	13.35	12.50	12.00	12.80	13.50	12.94	12.75	11.94	12.20

Heavy Melting Steel, Chicago, 1909-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$16.50	$16.00	$15.55	$15.95	$15.45	$14.95	$14.75	$15.05	$15.05	$14.45	$13.05	$12.50
1928.....	12.25	12.55	12.75	12.75	12.95	12.60	12.30	12.65	12.90	13.75	14.50	14.50
1927.....	13.20	13.10	13.05	13.10	12.35	12.00	12.10	12.35	12.20	11.75	11.50	11.95
1926.....	14.95	13.75	14.00	13.20	12.25	12.65	14.20	14.00	14.10	13.05	13.00	12.90
1925.....	19.45	17.55	16.70	15.00	14.90	15.90	15.35	16.05	16.45	16.25	16.40	15.80
1924.....	17.40	18.00	16.70	14.65	13.75	13.55	14.75	15.40	16.40	16.25	17.05	18.50
1923.....	18.70	19.75	23.15	22.40	19.75	17.75	17.10	16.25	16.55	14.50	13.80	16.00
1922.....	11.20	11.15	12.05	13.55	14.65	14.45	15.15	15.85	18.15	18.50	17.40	16.75
1921.....	15.25	15.25	12.55	11.25	11.50	11.20	10.55	10.70	11.30	12.55	12.40	11.00
1920.....	24.25	25.05	24.20	23.95	23.15	22.40	23.70	24.15	24.20	21.40	18.50	16.75
1919.....	19.20	14.90	15.25	16.40	15.40	16.75	19.40	20.75	19.00	18.80	20.65	21.25
1918.....	29.70	30.00	30.00	28.65	28.90	29.00	29.00	29.00	290.0	29.00	29.00	26.50
1917.....	20.25	21.65	23.00	26.65	28.70	37.00	35.50	33.10	32.65	27.00	28.50	28.90
1916.....	15.50	15.25	16.20	16.75	16.50	15.35	14.15	14.90	15.50	16.50	19.35	23.35
1915.....	8.90	9.45	9.75	9.30	9.25	9.40	10.15	11.50	12.00	11.55	13.15	15.40
1914.....	9.20	10.00	9.80	9.50	9.95	9.75	9.50	9.50	9.40	9.00	8.25	8.25
1913.....	12.75	12.50	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	9.00	9.00
1912.....	11.00	10.75	11.25	12.25	12.25	12.25	11.75	12.50	13.00	14.00	13.75	13.75
1911.....	11.50	12.00	12.00	11.50	10.25	10.25	10.25	10.75	10.50	10.00	9.75	9.75
1910.....	16.00	15.50	14.50	14.50	13.00	13.00	12.50	12.25	12.25	12.25	12.00	12.00
1909.....	14.00	13.40	12.15	12.90	13.50	14.15	14.05	14.95	15.80	16.30	15.75	15.50

Heavy Melting Steel, Eastern Pennsylvania, 1909-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$16.50	$16.30	$16.25	$17.00	$16.25	$16.25	$16.50	$16.75	$16.37	$15.80	$15.15	$14.50
1928.....	14.00	14.00	13.75	13.75	13.75	13.15	12.75	12.75	14.65	16.00	15.90	15.50
1927.....	15.60	15.00	14.75	14.75	14.45	14.25	13.75	13.75	14.00	14.00	14.00	14.00
1926.....	17.35	16.35	16.20	15.90	15.25	15.25	15.50	16.75	16.85	16.65	15.95	15.50
1925.....	20.00	17.85	16.25	15.50	15.00	15.65	16.00	16.75	17.25	17.00	17.60	17.70
1924.....	18.05	18.95	17.00	15.25	14.20	15.00	15.00	16.50	15.90	16.50	18.05	19.00
1923.....	19.70	21.20	24.85	23.50	20.40	18.65	17.25	16.00	16.85	15.50	15.50	17.00
1922.....	11.75	12.25	13.15	14.35	15.15	15.30	15.00	15.25	17.10	18.00	16.70	16.00
1921.....	15.00	14.50	13.40	11.75	11.80	11.85	11.25	11.25	11.75	12.25	12.60	12.00
1920.....	24.25	25.75	25.55	24.30	23.60	22.40	22.00	24.10	26.40	23.80	20.30	16.90
1919.....	19.00	15.25	14.25	15.85	15.30	16.15	18.85	19.60	19.00	19.55	20.80	23.90
1918.....	29.80	30.00	29.50	28.30	28.50	28.50	28.50	28.50	28.50	28.50	28.00	25.00
1917.....	21.75	20.25	23.50	25.00	26.00	32.60	37.00	32.80	30.75	26.00	26.80	28.00
1916.....	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915.....	10.00	10.50	11.00	11.25	11.50	11.50	12.00	13.50	14.50	15.00	14.50	16.00
1914.....	10.50	11.25	11.50	11.00	10.75	10.75	10.50	10.75	10.75	9.75	9.50	9.50
1913.....	14.50	13.50	13.50	13.75	12.50	12.00	11.50	11.75	12.00	11.00	10.25	10.00
1912.....	12.25	12.00	12.25	13.00	13.75	13.50	13.75	14.25	14.75	15.50	15.25	15.00
1911.....	12.75	14.25	14.25	13.75	13.25	13.00	13.00	13.25	12.75	12.00	12.25	12.50
1910.....	17.00	16.50	16.50	15.50	14.50	14.50	14.00	13.75	14.00	13.50	12.75	12.50
1909.....	17.00	15.50	13.75	13.50	14.50	15.50	16.00	17.00	17.50	18.00	18.00	17.25

Cast Borings, Pittsburgh, 1902-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$12.55	$12.25	$11.50	$12.15	$11.55	$11.85	$12.10	$12.50	$12.40	$11.80	$11.15	$10.75
1928.....	11.50	11.00	10.70	10.60	10.70	10.40	9.80	10.50	12.00	12.40	12.00	12.50
1927.....	12.50	12.00	12.10	12.38	11.13	10.50	10.50	11.50	11.30	11.00	11.00	11.60
1926.....	14.75	14.25	13.25	12.60	11.75	11.85	12.20	12.75	13.00	12.60	12.50	12.00
1925.....	17.20	15.60	14.50	13.60	12.85	13.40	13.50	14.50	14.85	14.10	15.10	14.80
1924.....	16.50	16.50	15.35	13.65	12.00	13.85	13.75	14.20	14.75	15.20	16.25	17.00
1923.....	18.50	19.75	21.80	21.10	21.60	17.50	15.50	15.00	16.00	13.40	12.40	14.00
1922.....	10.40	11.25	11.85	13.00	14.15	14.80	15.75	15.75	17.30	18.15	17.75	17.50
1921.....	12.50	12.35	11.60	9.70	9.50	9.00	7.60	8.00	9.05	11.60	10.65	9.55
1920.....	19.35	21.70	20.35	19.85	19.25	18.35	18.25	19.55	20.50	19.35	17.00	14.50
1919.....	14.00	11.80	10.95	12.60	11.30	11.65	13.90	16.10	15.75	15.75	17.95	18.35
1918.....	20.00	20.00	20.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	18.00
1917.....	12.35	12.25	13.20	14.70	15.45	21.10	23.90	22.00	23.55	20.70	20.00	20.00
1916.....	11.35	11.40	11.40	11.30	10.30	9.90	8.65	8.00	8.50	9.15	9.85	13.35
1915.....	8.25	8.15	8.40	8.40	8.40	8.65	8.65	9.00	9.25	9.75	10.00	10.20
1914.....	7.90	8.40	9.25	8.40	8.40	7.90	8.15	8.50	8.50	8.25	8.25	8.25
1913.....	10.40	10.40	10.40	10.40	10.40	9.25	8.40	8.15	8.15	8.40	7.75	7.45
1912.....	9.65	9.40	9.15	9.65	10.15	10.15	10.25	10.15	9.90	9.90	10.50	10.40
1911.....	8.65	8.65	9.50	8.75	8.50	8.90	8.90	9.25	9.40	8.50	8.25	8.35
1910.....	11.00	10.75	9.75	9.75	9.25	8.75	8.00	8.25	8.40	8.40	8.50	8.65
1909.....	10.75	9.75	8.25	7.75	7.25	9.65	9.75	9.50	10.65	11.15	11.25	11.00
1908.....	6.50	7.50	8.00	8.00	7.50	7.75	7.75	8.75	8.75	8.75	9.75	11.00
1907.....	12.40	12.65	13.15	13.65	13.50	13.75	13.75	13.25	13.25	13.00	9.95	6.50
1906.....	10.90	10.15	9.65	8.15	8.90	8.75	8.75	9.00	9.75	10.25	10.75	12.25
1905.....	10.75	11.25	11.15	10.90	10.15	10.00	9.15	8.40	8.90	9.75	10.50	10.90
1904.....	6.00	5.75	5.40	6.15	7.15	5.65	5.75	5.25	6.25	6.25	7.40	8.75
1903.....	11.25	11.50	11.65	11.25	11.25	.....	.....	9.00	9.00	7.00	.....	5.25
1902.....	8.55	9.15	9.65	10.75	11.75	12.00	11.65	10.75	14.40	15.85	11.65	11.50

No. 1 Railroad Wrought, Chicago, 1915-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$14.75	$15.75	$16.00	$16.65	$16.40	$15.40	$14.85	$15.40	$15.70	$14.85	$13.85	$13.25
1928.....	12.65	12.40	12.45	12.45	13.05	12.70	12.30	12.40	12.90	13.50	14.25	14.50
1927.....	14.20	13.95	13.50	13.50	12.75	12.10	12.35	13.45	12.70	11.40	11.25	11.25
1926.....	15.00	14.40	14.50	14.05	12.55	12.65	14.80	14.75	14.56	14.50	13.75	13.75
1925.....	19.15	17.75	16.65	14.60	14.65	15.90	15.90	17.45	17.05	16.30	17.70	15.90
1924.....	17.50	17.50	16.05	14.80	13.60	13.25	14.80	15.75	16.70	15.95	17.10	18.75
1923.....	19.40	20.50	23.25	22.75	19.95	16.95	16.60	17.05	18.25	15.30	14.10	16.00
1922.....	11.80	11.65	12.25	13.25	14.35	14.20	15.20	16.35	19.95	20.40	18.10	17.00
1921.....	15.65	15.90	13.50	12.05	11.90	10.80	10.25	11.75	13.05	14.65	13.70	12.10
1920.....	29.00	30.75	30.70	30.70	29.50	28.00	28.10	28.50	27.50	22.50	19.55	16.60
1919.....	23.30	16.65	17.65	18.50	17.05	18.70	21.20	23.25	21.25	22.00	26.50	27.00
1918.....	35.00	35.00	35.00*	35.00	35.00	35.00	34.50	33.50	33.50	33.50	33.50	29.00
1917.....	23.75	24.00	25.75	29.80	32.60	41.75	39.15	35.40	36.25	31.90	30.60	31.50
1916.....	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915.....	8.80	8.90	9.00	8.55	8.75	8.75	8.90	10.10	10.75	10.70	12.75	14.90

*Quotations net tons to March 31, 1918, gross tons thereafter

Market History—

No. 1 Railroad Wrought, Eastern Pennsylvania, 1904-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$15.50	$16.25	$16.25	$16.25	$16.25	$16.25	$16.25	$16.25	$16.13	$16.00	$16.25	$15.25
1928.....	15.25	15.25	15.25	15.25	15.25	15.25	15.25	14.80	15.10	15.50	15.50	15.50
1927.....	17.00	17.00	17.65	16.75	16.75	16.75	16.25	15.95	15.75	15.75	15.75	15.75
1926.....	18.35	18.00	18.00	17.75	17.35	17.00	17.00	17.25	17.00	17.00	17.00	17.00
1925.....	21.50	20.50	19.50	18.40	17.60	18.20	18.25	18.25	18.25	18.25	18.75	18.75
1924.....	20.10	21.35	19.00	18.40	17.75	17.75	18.05	18.50	18.75	18.75	18.95	19.00
1923.....	22.25	24.10	27.60	27.00	24.40	22.75	18.85	17.50	19.00	18.00	17.75	19.00
1922.....	15.00	15.00	15.20	15.63	16.80	17.25	18.00	18.00	20.75	22.00	21.00	18.95
1921.....	20.00	20.00	18.20	15.50	15.00	15.00	14.25	14.00	14.20	15.40	16.00	15.75
1920.....	32.90	36.10	36.50	35.25	34.00	33.50	33.50	33.25	34.40	29.85	25.75	20.10
1919.....	29.80	25.00	24.00	21.50	21.90	22.50	24.70	27.25	27.00	27.00	27.85	30.75
1918.....	35.00	35.00	35.00*	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	27.00	26.75	30.00	36.00	40.80	47.85	54.05	46.20	44.50	41.80	35.35	35.00
1916.....	22.25	22.50	23.00	23.00	22.50	20.00	19.75	20.00	21.00	22.00	20.55	26.75
1915.....	11.75	12.00	12.50	12.50	12.50	12.75	13.50	15.00	16.00	16.00	17.00	20.00
1914.....	12.90	14.75	15.25	13.15	13.15	12.65	12.65	12.00	12.50	11.50	11.50	11.50
1913.....	16.25	16.25	15.25	16.25	15.50	14.75	14.70	14.25	14.25	13.75	13.75	13.35
1912.....	15.75	14.75	14.50	14.25	16.25	16.00	15.75	15.25	16.65	16.75	17.75	16.75
1911.....	16.25	16.25	17.75	16.75	15.50	15.25	15.25	15.75	15.75	14.50	14.00	14.45
1910.....	18.75	19.00	18.75	19.25	18.25	16.75	16.25	16.25	16.15	16.75	16.25	16.25
1909.....	20.25	19.25	16.25	15.25	16.25	18.60	17.75	18.75	19.75	20.75	21.25	20.25
1908.....	14.25	14.25	15.25	14.75	15.50	15.75	16.00	16.50	18.25	18.25	18.50	19.75
1907.....	23.25	22.25	21.00	20.50	20.00	20.75	20.25	19.75	18.00	18.00	17.25	14.75
1906.....	22.75	21.00	19.75	20.25	20.75	18.25	17.50	18.25	20.75	22.25	22.25	23.25
1905.....	19.75	21.75	22.00	22.75	21.75	18.75	17.00	17.50	19.50	21.75	19.85	23.25
1904.....	14.65	16.00	16.50	18.25	17.75	14.00	12.75	13.25	14.40	15.25	16.25	19.00

*Quotations net tons to March 31, 1918, gross tons thereafter.

Machine Shop Turnings, Pittsburgh, 1906-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$12.50	$11.25	$10.65	$11.05	$11.00	$11.35	$11.85	$12.40	$12.00	$11.40	$10.75	$10.25
1928.....	10.60	10.15	10.15	10.25	9.90	9.20	8.80	9.65	11.00	11.25	10.85	12.00
1927.....	12.00	11.00	11.60	12.40	11.15	10.50	10.85	12.50	11.75	11.50	11.15	11.45
1926.....	14.50	13.60	13.00	12.60	11.65	11.00	11.60	12.85	13.05	12.00	11.85	11.50
1925.....	17.80	16.00	14.75	13.60	12.75	13.25	13.50	14.50	14.85	14.15	14.85	14.50
1924.....	15.50	16.10	15.00	13.25	11.10	13.00	13.50	14.00	14.75	11.40	16.00	17.50
1923.....	16.75	18.25	20.65	20.10	18.91	16.60	13.50	11.40	12.75	11.40	11.00	13.50
1922.....	9.50	9.55	10.65	12.30	13.45	13.65	13.75	13.95	15.45	15.40	16.25	15.90
1921.....	10.50	10.50	9.70	8.55	8.50	7.90	7.25	7.65	8.55	10.25	10.25	9.20
1920.....	16.75	19.25	18.40	16.85	15.15	17.65	13.55	15.75	15.80	16.00	14.75	11.60
1919.....	11.50	9.70	9.75	11.15	10.00	10.65	12.70	14.00	13.25	12.75	14.00	15.50
1918.....	20.00	20.00	20.00	19.00	18.70	18.50	18.50	18.50	18.50	18.50	18.50	17.75
1917.....	12.10	12.00	12.45	13.90	14.55	20.80	23.70	21.20	23.25	19.50	19.65	20.00
1916.....	10.35	9.55	10.75	11.20	10.35	10.05	8.55	7.75	7.25	8.00	9.10	12.75
1915.....	7.75	7.90	7.90	7.90	7.90	8.15	8.00	7.65	8.65	8.65	9.15	8.75
1914.....	6.90	7.65	7.65	8.70	8.00	7.90	7.90	7.90	7.90	8.00	7.95	7.75
1913.....	10.65	10.25	9.50	9.00	8.65	7.25	6.75	6.75	6.75	7.15	7.15	6.40
1912.....	10.25	9.75	9.50	10.00	10.25	10.90	11.00	11.00	10.65	10.90	11.50	11.25
1911.....	9.00	9.40	10.50	9.50	9.15	9.15	9.15	9.75	9.65	9.15	9.90	9.35
1910.....	13.25	13.00	12.00	11.75	11.25	10.25	9.25	9.25	9.00	9.00	9.15	9.25
1909.....	13.00	11.75	10.25	8.75	8.25	11.25	11.75	11.50	12.50	13.25	13.75	13.25
1908.....	7.75	8.75	8.75	8.50	8.25	8.25	8.25	9.00	9.50	9.50	10.50	11.75
1907.....	15.25	15.00	15.75	16.00	15.75	15.50	15.50	15.25	14.50	14.00	11.60	7.75
1906.....	.....	.....	12.50	11.75	11.25	11.25	11.25	11.50	12.40	12.25	12.40	14.75

Rails for Rolling, Chicago, 1908-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$17.10	$17.50	$17.50	$17.50	$17.50	$17.50	$17.50	$17.75	$17.60	$17.05	$15.30	$14.60
1928.....	15.00	15.00	14.45	14.00	14.35	14.85	14.50	15.00	15.80	16.40	16.50	16.50
1927.....	16.00	16.00	15.50	15.85	15.10	14.60	14.60	15.00	15.20	14.70	13.95	14.00
1926.....	17.55	16.30	16.50	16.00	14.95	15.10	17.10	17.25	17.25	16.65	16.50	16.50
1925.....	20.95	19.15	18.15	15.85	16.75	18.15	17.45	19.10	19.00	18.55	19.40	18.80
1924.....	18.90	20.00	19.30	17.10	15.30	14.55	15.50	16.00	17.40	17.20	18.20	19.50
1923.....	20.55	22.00	24.90	23.65	21.80	19.40	18.40	17.75	18.30	16.25	15.10	17.00
1922.....	12.50	11.50	12.85	14.25	15.50	15.40	16.00	16.75	19.40	20.50	18.90	18.00
1921.....	15.80	15.90	13.30	12.70	13.25	12.80	12.45	12.70	13.05	14.00	13.90	12.50
1920.....	33.60	34.65	32.60	32.50	31.50	32.35	34.90	38.00	38.50	34.00	24.15	17.40
1919.....	22.30	15.55	16.30	17.95	17.45	19.25	24.70	29.00	25.38	26.80	31.15	31.50
1918.....	35.30	35.00	35.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	27.25	25.65	27.25	31.90	36.80	46.00	46.25	41.90	41.25	36.00	35.70	35.65
1916.....	17.70	17.10	17.20	17.90	17.25	16.25	15.70	15.70	16.90	18.75	24.90	29.50
1915.....	9.50	9.60	10.00	9.85	10.00	10.00	10.10	11.75	13.15	13.25	14.30	16.70
1914.....	11.00	11.20	11.25	11.25	11.25	11.25	11.25	11.25	10.85	10.00	9.50	9.50
1913.....	16.25	15.50	15.00	14.50	14.00	14.00	12.00	12.50	12.00	12.00	12.00	11.50
1912.....	13.00	13.00	12.75	12.75	13.25	13.50	13.25	13.50	14.75	16.00	16.50	16.50
1911.....	13.50	13.50	13.50	13.00	12.75	12.25	12.25	12.50	12.25	12.25	12.00	12.25
1910.....	17.75	17.75	17.50	17.50	17.25	16.50	16.50	15.50	15.75	15.75	15.00	14.00
1909.....	15.80	15.05	12.80	13.20	14.65	15.50	15.55	16.00	17.20	18.00	20.25	17.70
1908.....	12.30	13.00	12.20	12.75	13.20	14.00	14.45	15.60	16.00	15.70	16.95	17.25

Finished Material

Per Pound f.o.b.

Rail Steel Bars, Chicago, 1918-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.90c	1.95c	1.90c
1928.....	1.80	1.80	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.90	1.95	2.00
1927.....	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.80	1.80	1.80
1926.....	2.00	2.00	2.00	2.00	2.00	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925.....	2.03	2.13	2.07	2.00	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1924.....	2.30	2.30	2.30	2.30	2.20	2.15	2.10	2.05	2.05	2.00	2.00	2.00
1923.....	2.00	2.00	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1922.....	1.60	1.50	1.50	1.55	1.65	1.65	1.70	1.80	1.95	2.00	2.00	2.00
1921.....	2.50	2.50	2.50	2.15	2.00	2.00	1.95	1.85	1.85	1.75	1.70	1.65
1920.....	2.90	3.20	3.35	3.70	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
1919.....	2.80	2.80	2.80	2.55	2.45	2.45	2.45	2.55	2.55	2.55	2.75	2.85
1918.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Market History—

Tank Plates, Pittsburgh, 1895-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	1.90c	1.90c	1.90c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.90c	1.90c
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927	1.90	1.85	1.90	1.85	1.85	1.80	1.80	1.80	1.80	1.75	1.75	1.80
1926	1.90	1.85	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
1925	2.00	2.10	2.10	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.85	1.90
1924	2.50	2.45	2.40	2.35	2.25	2.15	2.10	2.00	1.95	1.80	1.85	1.90
1923	2.05	2.15	2.35	2.45	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1922	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921	2.65	2.35	2.05	2.15	2.20	2.00	1.85	1.75	1.70	1.60	1.60	1.50
1920	3.10	3.70	3.75	3.65	3.50	3.50	3.50	3.50	3.50	3.20	3.00	2.65
1919	3.00	3.00	2.90	2.65	2.65	2.65	2.65	2.65	2.55	2.65	2.65	2.70
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917	4.25	4.30	5.00	5.45	6.40	7.75	9.45	9.20	7.50	3.25	3.25	3.25
1916	2.50	2.55	3.15	3.50	3.50	3.50	3.50	3.75	3.70	3.70	3.90	4.25
1915	1.10	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.45	1.70	1.95
1914	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.10	1.10
1913	1.50	1.50	1.50	1.50	1.50	1.45	1.45	1.45	1.40	1.35	1.30	1.20
1912	1.15	1.10	1.10	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.30	1.25	1.20	1.10	1.15
1910	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908	1.70	1.70	1.70	1.70	1.70	1.65	1.60	1.60	1.60	1.60	1.60	1.60
1907	1.70	1.70	1.70	1.70	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.70
1906	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70
1905	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.60	1.60	1.60
1904	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.50
1903	1.60	1.60	1.75	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1901	1.40	1.40	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900	2.40	2.20	2.00	1.80	1.60	1.35	1.05	1.10	1.05	1.05	1.35	1.40
1899	1.30	1.45	1.75	2.05	2.10	2.30	2.45	2.55	2.85	2.80	2.50	2.30
1898	1.00	1.00	0.95	1.00	1.10	1.10	1.10	1.10	1.15	1.10	1.10	1.15
1897	1.10	1.10	1.10	1.05	1.05	1.00	1.00	1.00	1.00	1.05	1.00	1.00
1896	1.40	1.35	1.30	1.35	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10
1895	1.15	1.10	1.10	1.15	1.20	1.25	1.60	1.70	1.80	1.70	1.60	1.50

Steel Bars, Pittsburgh, 1901-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	1.90c	1.90c	1.90c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.90c	1.90c	1.90c
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927	1.95	1.90	1.90	1.90	1.85	1.85	1.80	1.80	1.80	1.75	1.75	1.80
1926	2.00	2.00	2.00	2.00	1.95	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1924	2.40	2.40	2.40	2.30	2.25	2.20	2.15	2.10	2.05	2.00	2.05	2.10
1923	2.00	2.15	2.30	2.35	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1922	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921	2.35	2.15	2.00	2.05	2.10	2.05	1.85	1.75	1.65	1.60	1.55	1.50
1920	3.10	3.85	3.85	3.65	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.35
1919	2.70	2.70	2.60	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.45	2.90
1918	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
1917	3.20	3.20	3.45	3.65	3.65	4.00	4.70	4.75	4.25	2.90	2.90	2.90
1916	2.40	2.40	2.65	3.00	3.00	2.85	2.75	2.55	2.60	2.70	2.95	3.15
1915	1.10	1.10	1.15	1.20	1.20	1.20	1.30	1.35	1.30	1.45	1.70	1.90
1914	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.15	1.10	1.10
1913	1.45	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.35	1.25
1912	1.15	1.15	1.10	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.40	1.40
1911	1.40	1.40	1.40	1.40	1.40	1.25	1.25	1.20	1.15	1.10	1.10	1.10
1910	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.40	1.40	1.40	1.40
1909	1.40	1.30	1.20	1.15	1.20	1.20	1.25	1.35	1.40	1.40	1.45	1.50
1908	1.60	1.60	1.60	1.60	1.60	1.50	1.40	1.40	1.40	1.40	1.40	1.40
1907	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1906	2.00	1.75	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.55	1.60
1905	1.45	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.70	1.80	1.95
1904	1.30	1.30	1.35	1.35	1.30	1.30	1.30	1.30	1.30	1.35	1.30	1.40
1903	1.65	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.30
1902	1.60	1.50	1.50	1.65	1.80	1.80	1.70	1.75	1.75	1.70	1.60	1.70
1901	1.20	1.25	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.60

Structural Shapes, Pittsburgh, 1895-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929	1.90c	1.90c	1.90c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.95c	1.90c	1.90c
1928	1.80	1.85	1.90	1.85	1.85	1.85	1.85	1.85	1.90	1.95	1.95	1.90
1927	1.95	1.90	1.90	1.90	1.85	1.80	1.80	1.80	1.80	1.75	1.75	1.80
1926	1.90	1.90	1.90	1.90	1.90	1.90	2.00	2.00	2.00	2.00	2.00	2.00
1925	2.10	2.10	2.10	2.00	2.00	2.00	2.00	2.00	1.90	1.90	2.00	1.95
1924	2.50	2.50	2.50	2.35	2.25	2.20	2.15	2.05	2.00	2.00	2.00	2.00
1923	2.05	2.15	2.35	2.45	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1922	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	1.95
1921	2.45	2.25	2.10	2.15	2.20	2.05	1.90	1.75	1.70	1.60	1.60	1.50
1920	2.65	3.15	3.25	3.25	3.25	3.25	3.25	3.15	3.10	3.10	3.00	2.45
1919	2.80	2.80	2.70	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.50
1918	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1917	3.10	3.25	3.45	3.70	4.00	4.00	4.50	4.50	3.75	3.00	3.00	3.00
1916	1.85	2.05	2.40	2.50	2.50	2.50	2.50	2.50	2.60	2.70	2.90	3.00
1915	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.65	1.75
1914	1.20	1.20	1.20	1.20	1.15	1.10	1.10	1.15	1.20	1.15	1.10	1.05
1913	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.35	1.30	1.25
1912	1.15	1.15	1.15	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.30	1.20	1.15
1910	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908	1.70	1.70	1.70	1.70	1.70	1.65	1.65	1.60	1.60	1.60	1.60	1.60
1907	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1906	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1905	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.70	1.70	1.70
1904	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.40
1903	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902	1.60	1.60	1.70	1.85	2.00	2.25	2.25	2.35	2.25	2.15	2.10	2.00
1901	1.50	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900	2.25	2.25	2.25	2.25	2.25	2.05	1.90	1.75	1.70	1.70	1.70	1.70
1899	1.30	1.30	1.40	1.50	1.50	1.75	1.95	2.05	2.25	2.25	2.25	2.25
1898	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.20	1.20	1.20
1897	1.55	1.55	1.55	1.55	1.30	1.05	1.00	1.00	1.00	1.10	1.10	1.10
1896	1.45	1.50	1.45	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.50	1.45
1895	1.25	1.20	1.20	1.20	1.20	1.35	1.50	1.60	1.65	1.60	1.60	1.55

Market History—

Bar Iron, Chicago, 1907-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.00c	2.05c	2.00c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.05c	2.00c	2.00c
1928.....	1.90	1.95	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1927.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.90	1.85	1.90
1926.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1925.....	2.00	2.00	2.10	2.10	2.10	2.05	1.95	1.90	1.90	1.90	2.00	2.00
1924.....	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.15	2.15	2.10	2.10	2.00
1923.....	2.35	2.45	2.55	2.60	2.60	2.60	2.55	2.50	2.40	2.40	2.40	2.40
1922.....	1.60	1.60	1.60	1.65	1.65	1.75	1.80	2.00	2.25	2.50	2.50	2.35
1921.....	2.75	2.65	2.65	2.50	2.45	2.25	1.95	1.75	1.75	1.75	1.70	1.65
1920.....	3.15	3.45	3.50	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.50
1919.....	3.15	2.95	2.85	2.55	2.50	2.55	2.65	2.65	2.65	2.70	2.75	2.75
1918.....	3.50	50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.00	3.20	3.40	4.00	4.50	4.50	4.50	4.50	4.00	4.00
1916.....	1.85	1.90	2.20	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.50	2.60
1915.....	0.95	1.05	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.50	1.70
1914.....	1.15	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.05	1.05	0.95	0.95
1913.....	1.60	1.60	1.60	1.55	1.55	1.55	1.50	1.45	1.35	1.25	1.15	1.15
1912.....	1.15	1.15	1.15	1.15	1.25	1.25	1.35	1.40	1.45	1.50	1.55	1.55
1911.....	1.30	1.30	1.25	1.20	1.20	1.20	1.20	1.20	1.20	1.15	1.15	1.15
1910.....	1.60	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.40	1.35	1.35	1.30
1909.....	1.50	1.50	1.40	1.30	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.60	1.55	1.55	1.55	1.55	1.55	1.50	1.50	1.50	1.50	1.50	1.50
1907.....	1.80	1.80	1.80	1.80	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

No. 24 Black Sheets, Pittsburgh, 1907-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.85c	2.85c	2.85c	2.90c	2.95c	2.95c	2.85c	2.85c	2.85c	2.80c	2.75c	2.75c
1928.....	2.80	2.85	2.85	2.75	2.75	2.70	2.65	2.65	2.70	2.70	2.80	2.85
1927.....	2.95	2.90	2.90	2.80	2.90	3.00	3.00	3.00	3.00	2.95	2.80	2.75
1926.....	3.35	3.35	3.25	3.25	3.20	3.10	3.10	3.10	*3.05	3.05	3.10	3.10
1925.....	3.50	3.50	3.40	3.35	3.25	3.15	3.15	3.15	3.10	3.10	3.25	3.35
1924.....	3.75	3.75	3.75	3.70	3.65	3.65	3.60	3.50	3.45	3.40	3.45	3.50
1923.....	3.35	3.35	3.55	3.85	3.85	3.85	3.85	3.85	3.75	3.75	3.75	3.75
1922.....	3.00	3.00	3.00	3.10	3.15	3.15	3.15	3.25	3.40	3.50	3.35	3.30
1921.....	4.35	4.20	3.90	3.90	4.00	3.90	3.35	3.05	2.80	3.00	2.95	3.00
1920.....	5.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	6.05	4.45
1919.....	4.70	4.70	4.60	4.35	4.35	4.30	4.30	4.35	4.35	4.35	4.35	4.35
1918.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1917.....	4.55	4.55	5.05	5.75	7.00	8.15	9.00	9.00	8.75	7.75	5.30	5.00
1916.....	2.55	2.60	2.75	2.90	2.95	2.90	2.90	2.75	2.85	3.20	3.65	4.45
1915.....	1.80	1.80	1.80	1.80	1.80	1.80	1.75	1.85	1.90	2.05	2.20	2.50
1914.....	1.85	1.95	1.95	1.90	1.85	1.80	1.80	1.90	1.95	1.95	1.90	1.80
1913.....	2.30	2.35	2.35	2.35	2.35	2.30	2.25	2.20	2.10	2.00	1.95	1.90
1912.....	1.90	1.85	1.80	1.85	1.95	1.95	2.00	2.05	2.10	2.20	2.25	2.25
1911.....	2.20	2.20	2.20	2.15	2.15	2.00	2.00	1.95	1.90	1.85	1.85	1.90
1910.....	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.20	2.1[illegible]	2.15	2.15	2.15
1909.....	2.40	2.40	2.30	2.20	2.20	2.20	2.20	2.20	2.[illegible]	2.30	2.40	2.40
1908.....	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2	2.50	2.50	2.50
1907.....	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2 0	2.60	2.60	2.60

*No. 28 gage before Sept. 1, 1926.

Automobile Sheets, Pittsburgh, 1922-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	4.10c	4.10c	4.10c	4.10c	4.10c	4.10c	4.10c	4.10c	4.10c	4.05c	4.00c	4.00c
1928.....	4.00	4.10	4.15	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.05	4.10
1927.....	4.20	4.15	4.15	4.15	4.25	4.25	4.25	4.25	4.25	4.15	4.15	4.10
1926.....	4.50	4.40	4.40	4.35	4.30	4.25	4.20	4.25	*4.25	4.25	4.25	4.25
1925.....	4.75	4.70	4.55	4.45	4.35	4.30	4.25	4.25	4.25	4.35	4.45	4.50
1924.....	5.35	5.35	5.30	5.35	5.10	5.10	5.10	4.85	4.75	4.60	4.65	4.70
1923.....	4.85	4.95	5.35	5.50	5.50	5.50	5.35	5.35	5.35	5.35	5.35	5.35
1922.....	....	....	....	....	....	....	....	....	....	....	4.85	4.85

*No. 22 gage previous to September 1926; No. 20 gage since.

No. 24 Galvanized Sheets, Pittsburgh, 1903-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	3.60c	3.60c	3.60c	3.65c	3.70c	3.65c	3.60c	3.55c	3.50c	3.50c	3.45c	3.45c
1928.....	3.65	3.65	3.75	3.65	3.65	3.55	3.50	3.50	3.50	3.50	3.55	3.60
1927.....	3.80	3.70	3.70	3.65	3.80	3.80	3.85	3.85	3.85	3.80	3.70	3.60
1926.....	4.60	4.60	4.60	4.60	4.55	4.30	4.30	4.30	*3.95	3.90	3.95	3.95
1925.....	4.75	4.75	4.70	4.55	4.35	4.20	4.20	4.20	4.20	4.25	4.50	4.60
1924.....	4.95	4.90	4.90	4.85	4.80	4.80	4.70	4.60	4.60	4.60	4.60	4.60
1923.....	4.35	4.35	4.65	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.85	4.90
1922.....	4.00	4.00	4.00	4.10	4.15	4.15	4.15	4.25	4.40	4.50	4.35	4.35
1921.....	5.70	5.50	5.05	4.90	5.00	4.90	4.35	4.05	3.80	4.00	3.95	4.00
1920.....	6.35	7.00	7.25	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.35	5.85
1919.....	6.05	6.05	5.95	5.70	5.70	5.65	5.65	5.70	5.70	5.70	5.70	5.70
1918.....	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1917.....	6.55	6.80	6.80	7.55	8.80	9.95	10.25	10.25	9.70	8.80	6.50	6.25
1916.....	4.75	4.75	4.80	4.85	4.85	4.80	4.35	4.25	4.20	4.45	5.05	6.25
1915.....	2.75	3.00	3.40	3.30	3.40	4.45	4.55	3.95	3.65	3.50	3.90	4.75
1914.....	2.85	2.95	2.95	2.90	2.80	2.75	2.75	2.85	2.95	2.95	2.85	2.80
1913.....	3.45	3.50	3.50	3.50	3.40	3.40	3.30	3.25	3.15	3.05	2.95	2.85
1912.....	3.20	3.20	3.00	3.00	3.10	3.10	3.10	3.30	3.50	3.50	3.50	3.50
1911.....	3.20	3.20	3.20	3.20	3.20	3.00	3.00	3.00	2.80	3.00	3.00	3.20
1910.....	3.70	3.70	3.70	3.70	3.50	3.20	3.20	3.20	3.20	3.20	3.20	3.20
1909.....	3.40	3.30	3.40	3.40	3.40	3.50	3.50	3.50	3.60	3.60	3.70	3.70
1908.....	3.70	3.70	3.70	3.60	3.50	3.50	3.50	3.50	3.30	3.30	3.20	3.20
1907.....	4.00	4.00	4.00	3.80	3.80	3.80	3.70	3.70	3.60	3.60	3.50	3.50
1906.....	3.60	3.60	3.70	3.80	3.80	3.80	3.80	3.90	3.80	4.00	4.00	4.00
1905.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1904.....	3.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.50
1903.....	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.50	3.50	3.50

*No. 28 gage before Sept. 1, 1926.

Market History—

No. 10 Blue Annealed, Pittsburgh, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.10c	2.10c	2.10c	2.15c	2.20c	2.20c	2.20c	2.20c	2.20c	2.20c	2.20c	2.20c
1928.....	2.10	2.10	2.10	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10
1927.....	2.25	2.20	2.20	2.20	2.25	2.25	2.25	2.25	2.25	2.15	2.10	2.10
1926.....	2.50	2.50	2.50	2.50	2.45	2.35	2.30	2.30	2.30	2.35	2.40	2.40
1925.....	2.70	2.70	2.65	2.55	2.45	2.30	2.30	2.30	2.25	2.25	2.40	2.50
1924.....	2.95	2.90	2.95	2.80	2.80	2.80	2.75	2.70	2.70	2.60	2.60	2.70
1923.....	2.50	2.50	2.70	2.80	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.90
1922.....	2.25	2.25	2.25	2.35	2.40	2.40	2.40	2.45	2.50	2.60	2.60	2.50
1921.....	3.55	3.55	3.05	2.95	3.10	3.00	2.55	2.40	2.30	2.50	2.40	2.25
1920.....	4.05	5.50	5.50	4.85	5.00	5.00	5.00	5.00	5.00	5.00	4.95	3.65
1919.....	3.90	3.90	3.80	3.55	3.55	3.50	3.50	3.55	3.55	3.55	3.55	3.55
1918.....	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1917.....	4.10	4.35	4.70	5.35	6.65	8.00	8.50	8.50	8.50	7.85	4.75	4.25
1916.....	2.45	2.60	2.85	3.00	3.05	3.10	3.00	3.00	2.95	3.15	3.30	3.90
1915.....	1.30	1.30	1.30	1.30	1.35	1.35	1.35	1.35	1.50	1.60	1.85	2.25
1914.....	1.35	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.40	1.40	1.40	1.35
1913.....	1.70	1.75	1.75	1.75	1.75	1.75	1.70	1.65	1.60	1.55	1.45	1.40

Tin Plate, Pittsburgh, 1903-1929

Per Base Box, 100 lbs., Pittsburgh

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35	$5.35
1928.....	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.30	5.35
1927.....	5.50	5.50	5.50	5.50	5.50	5.45	5.50	5.50	5.50	5.30	5.30	5.25
1926.....	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1925.....	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1924.....	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1923.....	4.75	4.75	4.95	4.95	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
1922.....	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
1921.....	7.00	7.00	7.00	6.65	6.25	6.25	5.65	5.25	5.15	5.00	4.80	4.75
1920.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1919.....	7.35	7.35	7.25	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1918.....	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75
1917.....	6.90	7.00	7.50	7.50	7.90	9.25	10.00	10.00	10.00	10.00	8.20	7.75
1916.....	3.75	3.75	4.15	4.70	5.15	5.55	5.80	6.00	5.60	5.75	6.05	6.50
1915.....	3.10	3.10	3.10	3.20	3.20	3.10	3.10	3.10	3.10	3.10	3.35	3.60
1914.....	3.40	3.40	3.40	3.40	3.40	3.30	3.25	3.45	3.55	3.35	3.15	3.20
1913.....	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.55	3.50	3.40
1912.....	3.40	3.40	3.50	3.50	3.50	3.50	3.50	3.70	3.70	3.70	3.70	3.60
1911.....	3.70	3.70	3.70	3.60	3.60	3.60	3.60	3.50	3.50	3.40	3.40	3.40
1910.....	3.50	3.50	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
1909.....	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.50	3.50	3.50
1908.....	3.60	3.60	3.60	3.60	3.60	3.50	3.50	3.50	3.50	3.50	3.50	3.40
1907.....	3.90	3.90	3.90	3.90	3.80	3.80	3.70	3.70	3.70	3.60	3.60	3.60
1906.....	3.50	3.50	3.50	3.60	3.70	3.70	3.80	3.90	3.90	3.90	4.00	4.00
1905.....	3.50	3.50	3.50	3.50	3.50	3.40	3.40	3.40	3.30	3.30	3.40	3.50
1904.....	3.40	3.40	3.30	3.30	3.20	3.20	3.20	3.10	3.30	3.40	3.50	3.50
1903.....	3.80	3.80	3.90	3.90	3.80	3.80	3.70	3.70	3.60	3.60	3.60	3.50

Plain Wire, Pittsburgh, 1912-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.45c	2.40c	2.40c	2.40c
1928.....	2.40	2.45	2.50	2.50	2.50	2.50	2.45	2.40	2.40	2.40	2.40	2.50
1927.....	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.60	2.60	2.60	2.55	2.50	2.45	2.50	2.50	2.50	2.50	2.50	2.50
1924.....	2.75	2.75	2.75	2.75	2.70	2.65	2.60	2.60	2.55	2.50	2.50	2.60
1923.....	2.45	2.60	2.65	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1922.....	2.25	2.20	2.25	2.25	2.25	2.25	2.25	2.25	2.40	2.45	2.45	2.45
1921.....	3.25	3.20	3.00	3.00	3.00	2.75	2.50	2.50	2.60	2.60	2.60	2.25
1920.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.20	3.25	3.25	3.25
1919.....	3.25	3.25	3.20	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.15	3.25
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	2.95	2.95	3.10	3.20	3.45	3.60	3.95	3.95	3.95	3.85	3.25	3.25
1916.....	1.95	2.10	2.25	2.25	2.45	2.45	2.45	2.55	2.55	2.60	2.80	2.95
1915.....	1.30	1.35	1.40	1.40	1.35	1.35	1.40	1.40	1.55	1.60	1.70	1.90
1914.....	1.35	1.40	1.40	1.40	1.35	1.30	1.30	1.35	1.35	1.40	1.40	1.30
1913.....	1.55	1.55	1.55	1.60	1.60	1.60	1.50	1.45	1.45	1.40	1.40	1.35
1912.....	1.35	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.55	1.55	1.55

Wire Nails, Pittsburgh, 1907-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.65c	2.65c	2.65c	2.65c	2.65c	2.65c	2.65c	2.65c	2.50c	2.45c	2.40c	2.40c
1928.....	2.50	2.60	2.65	2.60	2.60	2.60	2.55	2.55	2.55	2.55	2.55	2.65
1927.....	2.65	2.60	2.55	2.55	2.50	2.55	2.55	2.55	2.55	2.55	2.50	2.50
1926.....	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
1925.....	2.85	2.85	2.85	2.20	2.25	2.75	2.65	2.65	2.65	2.65	2.65	2.65
1924.....	3.00	3.00	3.00	3.00	2.95	2.90	2.85	2.85	2.80	2.75	2.75	2.85
1923.....	2.70	2.75	2.90	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1922.....	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.65	2.70	2.70	2.70
1921.....	3.25	3.00	3.00	3.25	3.25	3.00	2.75	2.75	2.90	2.90	2.90	2.50
1920.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1919.....	3.50	3.50	3.45	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.45	3.50
1918.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.15	3.20	3.50	3.65	4.00	4.00	4.00	3.90	3.50	3.50
1916.....	2.15	2.20	2.40	2.40	2.50	2.50	2.50	2.60	2.60	2.65	2.85	3.00
1915.....	1.50	1.55	1.60	1.60	1.55	1.55	1.60	1.60	1.70	1.75	1.85	2.00
1914.....	1.55	1.60	1.60	1.60	1.60	1.55	1.55	1.55	1.60	1.60	1.60	1.50
1913.....	1.75	1.75	1.75	1.80	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.60
1912.....	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.70	1.70	1.75	1.75
1911.....	1.70	1.75	1.80	1.80	1.75	1.80	1.70	1.70	1.65	1.65	1.55	1.55
1910.....	1.85	1.85	1.85	1.85	1.80	1.80	1.70	1.70	1.70	1.70	1.65	1.70
1909.....	1.95	1.95	1.95	1.95	1.60	1.70	1.70	1.80	1.80	1.80	1.80	1.85
1908.....	2.05	2.05	2.05	2.05	2.05	2.00	1.95	1.95	1.95	1.95	1.95	1.95
1907.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05	2.05

Market History—

Cold Finished Steel Bars, Pittsburgh, 1920-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.20c	2.20c	2.25c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.20c	2.20c
1928.....	2.30	2.25	2.25	2.20	2.20	2.15	2.10	2.15	2.20	2.20	2.20	2.20
1927.....	2.35	2.35	2.40	2.40	2.40	2.35	2.30	2.30	2.20	2.15	2.10	2.10
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.45	2.40	2.40
1925.....	2.80	2.80	2.75	2.70	2.70	2.60	2.55	2.50	2.50	2.45	2.50	2.50
1924.....	3.00	3.00	3.00	3.00	3.00	2.90	2.85	2.80	2.75	2.70	2.70	2.80
1923.....	2.50	2.65	2.85	3.00	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.90
1922.....	2.00	1.90	1.85	1.85	2.00	2.00	2.05	2.15	2.50	2.50	2.50	2.50
1921.....	3.60	3.60	3.10	3.05	3.10	3.00	2.75	2.50	2.40	2.25	2.15	2.00
1920.....	3.65	3.85	4.50	5.25	4.40	4.50	4.10	4.55	4.25	4.10	4.00	3.60

Cold Rolled Strip, Pittsburgh, 1910-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.85c	2.85c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
1928.....	3.00	3.10	3.15	*2.75	2.75	2.75	2.75	2.70	2.75	2.75	2.80	2.85
1927.....	3.10	2.90	2.95	3.00	3.00	3.25	3.25	3.25	3.15	2.95	2.95	3.00
1926.....	3.90	3.90	3.90	3.85	3.75	3.70	3.65	3.50	3.50	3.50	3.25	3.25
1925.....	4.10	4.15	4.05	4.00	3.85	3.65	3.75	3.75	3.75	3.75	3.90	3.90
1924.....	5.00	4.80	4.80	4.75	4.50	4.50	4.35	4.20	4.00	4.00	4.00	4.15
1923.....	4.50	4.65	4.80	5.15	5.25	5.25	5.00	5.00	5.00	5.00	5.00	4.75
1922.....	3.50	3.50	3.50	3.60	3.70	3.95	4.00	4.00	4.25	4.50	4.50	4.50
1921.....	6.25	6.25	5.65	5.50	5.50	5.00	4.40	3.90	3.75	3.75	3.80	3.75
1920.....	5.65	7.00	8.80	8.50	8.50	8.50	8.50	8.50	7.35	8.50	8.00	6.85
1919.....	6.25	6.25	6.10	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
1918.....	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1917.....	6.50	6.50	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.50	6.50
1916.....	4.25	4.65	5.50	6.00	6.00	6.00	6.00	6.00	6.00	6.50	6.50	6.50
1915.....	2.75	2.75	2.75	2.75	2.75	2.85	2.85	3.00	3.10	3.25	3.50	3.75
1914.....	3.05	3.05	3.05	3.05	3.05	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1913.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.05
1912.....	2.95	2.95	2.95	2.95	3.00	3.05	3.05	3.05	3.05	3.15	3.20	3.25
1911.....	2.95	2.95	3.25	3.25	3.25	2.95	2.95	2.95	2.95	2.95	2.95	2.95
1910.....	....	....	....	....	....	....	2.95	2.95	2.95	2.95	2.95	2.95

*April, 1928, and subsequently, prices are for 3 tons or over, instead of less than 3 tons.

Hot Rolled Strip, Wide, Pittsburgh, 1917-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	1.80c	1.85c	1.90c	1.90c	1.90c	1.90c	1.90c	1.90c	1.90c	1.90c	1.90c	1.90c
1928.....	1.85	1.85	1.90	1.90	1.85	1.85	1.90	1.85	1.80	1.80	1.80	1.80
1927.....	2.20	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.00	1.90
1926.....	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
1925.....	2.35	2.40	2.35	2.20	2.20	2.20	2.20	2.20	2.20	2.25	2.30	2.30
1924.....	3.00	2.95	2.85	2.75	2.60	2.55	2.50	2.50	2.45	2.35	2.25	2.35
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.20	3.15	3.10	3.00	3.00	2.75
1922.....	2.00	1.80	1.80	1.95	2.05	2.35	2.50	2.50	2.75	2.90	2.90	2.80
1921.....	3.30	3.30	2.85	2.75	2.75	2.70	2.50	2.30	2.15	2.15	2.25	2.00
1920.....	3.70	4.80	5.25	5.45	5.50	5.50	5.50	5.50	5.50	5.50	5.00	3.90
1919.....	3.80	3.55	3.30	3.25	3.05	3.05	3.10	3.30	3.30	3.30	*3.30	*3.30
1918.....	4.50	4.50	4.50	4.50	4.25	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	....	....	....	....	....	7.25	7.25	7.25	7.00	7.00	5.25	4.50

*First quarter 1920 delivery.

Hot Rolled Strip, Narrow, Pittsburgh, 1928-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	1.90c	1.95c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c
1928.....	2.10	2.10	2.10	2.05	2.00	2.00	2.00	1.95	1.95	2.00	1.90	1.90

Bands, Pittsburgh, 1916-1929

This designation was superseded in 1928 by narrow hot rolled strip.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	1.90c	1.95c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c
1928.....	2.10	2.10	2.10	2.05	2.00	2.00	2.00	1.95	1.95	2.00	1.90	1.90
1927.....	2.40	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2.20	2.15
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.45	2.50	2.50
1924.....	3.00	3.00	2.85	2.75	2.75	2.70	2.60	2.60	2.40	2.40	2.40	2.40
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.15	3.15	3.15	3.15	3.00	2.90
1922.....	1.75	1.75	1.70	1.85	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.35	2.20	2.20	2.25	2.15	2.00
1920.....	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	2.90	2.90	2.90	2.90	3.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.35	3.35	3.60	5.50	6.00	6.00	6.00	6.00	4.30	2.90
1916.....	1.85	2.05	2.35	2.50	2.50	2.50	2.50	2.60	2.60	2.60	2.75	2.90

Market History—

Hoops, Pittsburgh, 1908-1929

This designation was superseded in 1928 by narrow hot rolled strip

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	1.90c	1.95c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c	2.00c
1928.....	2.10	2.15	2.20	2.15	2.15	2.10	2.10	2.05	2.10	2.10	2.00	2.00
1927.....	2.40	2.25	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.25	2.20	2.15
1926.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.45	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.45	2.50	2.50
1924.....	3.00	3.00	2.85	2.75	2.75	2.70	2.60	2.60	2.55	2.50	2.50	2.50
1923.....	2.75	2.85	3.10	3.30	3.30	3.30	3.15	3.15	3.15	3.15	3.00	2.90
1922.....	1.95	1.85	1.80	1.95	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.45	2.40	2.30	2.25	2.20	2.15
1920.....	3.05	3.05	3.50	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	3.50	3.50	3.05	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.50	3.50	3.90	4.10	4.70	5.75	6.00	6.00	6.00	6.00	4.60	3.50
1916.....	2.00	2.25	2.55	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.25	3.25
1915.....	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.30	1.40	1.50	1.75	1.95
1914.....	1.40	1.30	1.30	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
1913.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	1.40
1912.....	1.30	1.25	1.25	1.25	1.25	1.25	1.35	1.40	1.40	1.45	1.50	1.50
1911.....	1.50	1.50	1.45	1.45	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30
1910.....	1.60	1.60	1.60	1.60	1.50	1.55	1.55	1.55	1.50	1.50	1.50	1.50
1909.....	1.80	1.75	1.60	1.60	1.50	1.40	1.40	1.40	1.50	1.50	1.50	1.55
1908.....	2.00	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.80	1.80	1.80	1.80

Angle Bars, Chicago, 1914-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
1928.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1927.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1926.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1925.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1924.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1923.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1922.....	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.75	2.75	2.75
1921.....	2.75	2.75	2.75	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.55
1920.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1919.....	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.15
1917.....	2.25	2.25	2.35	2.75	2.95	3.25	3.45	3.25	3.25	3.25	3.25	3.25
1916.....	1.50	1.50	1.50	1.50	1.90	2.00	2.00	2.00	2.00	2.15	2.25	2.25
1915.....	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1914.....	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50

Tie Plates, Chicago, 1915-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c	2.15c
1928.....	2.25	2.25	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1927.....	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.25	2.25
1926.....	2.30	2.25	2.25	2.25	2.25	2.25	2.25	2.30	2.35	2.35	2.35	2.35
1925.....	2.35	2.45	2.45	2.40	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
1924.....	2.60	2.60	2.60	2.60	2.60	2.60	2.55	2.45	2.45	2.35	2.35	2.35
1923.....	2.40	2.45	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1922.....	1.90	1.85	1.75	1.80	1.85	1.85	1.85	2.00	2.20	2.35	2.35	2.35
1921.....	3.00	3.00	3.00	2.75	2.50	2.50	2.40	2.15	2.00	2.00	2.00	1.90
1920.....	2.75	2.75	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.00	3.00	3.00
1919.....	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	2.75	2.75	2.90	3.00	3.00	3.00	3.40	3.50	3.50	3.50	3.50	3.45
1916.....	1.80	2.05	2.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.75
1915.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.50	1.70	1.80

Track Bolts, Chicago, 1914-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c	3.80c
1928.....	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
1927.....	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.80	3.80	3.80
1926.....	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1925.....	3.90	4.00	4.00	4.00	3.95	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1924.....	4.10	4.10	4.10	4.10	4.10	4.10	3.90	3.80	3.80	3.80	3.80	3.80
1923.....	3.90	4.05	4.15	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1922.....	3.60	3.50	3.50	3.60	3.90	3.90	3.60	3.60	3.80	3.85	3.85	3.85
1921.....	5.00	5.00	5.00	4.85	4.75	4.45	4.40	4.15	3.65	3.65	3.65	3.60
1920.....	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.75	4.95	5.00	5.00	5.00
1919.....	4.90	4.90	4.90	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
1918.....	4.90	4.85	5.05	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
1917.....	4.25	4.50	4.50	4.55	5.00	5.05	5.55	5.25	5.25	5.25	5.25	5.15
1916.....	2.60	2.65	3.20	3.25	3.25	3.25	3.25	3.25	3.25	3.60	4.20	4.25
1915.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10	2.10	2.35	2.50
1914.....	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Market History—

Railroad Spikes, Pittsburgh, 1916-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c	2.80c
1928.....	2.70	2.75	2.75	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1927.....	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
1926.....	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.75	2.80	2.80	2.80	2.80
1925.....	2.90	2.90	2.85	2.80	2.80	2.80	2.80	2.75	2.75	2.80	2.80	2.80
1924.....	3.05	3.05	3.05	3.00	2.95	2.90	2.80	2.80	2.75	2.70	2.75	2.80
1923.....	2.85	2.90	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.05
1922.....	2.25	2.15	2.05	2.20	2.25	2.30	2.25	2.30	2.80	2.80	2.75	2.75
1921.....	3.65	3.65	3.30	3.30	3.25	3.25	3.00	2.75	2.45	2.35	2.30	2.25
1920.....	3.45	3.70	3.95	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.75
1919.....	3.65	3.65	3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
1918.....	4.00	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1917.....	3.40	3.40	3.50	3.65	3.90	4.20	4.70	6.20	6.50	6.15	5.00	4.75
1916.....	2.15	2.25	2.50	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	3.25

Structural Rivets, Pittsburgh, 1913-1929

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	2.85c	2.90c	2.95c	3.10c	3.10c	3.10c	3.10c	3.10c	3.10c	3.10c	3.10c	3.10c
1928.....	2.75	2.75	2.80	2.90	2.90	2.90	2.90	2.85	2.80	2.80	2.80	2.80
1927.....	2.35	2.30	2.30	2.75	2.75	2.75	2.75	2.85	2.85	2.75	2.75	2.75
1926.....	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1925.....	2.60	2.55	2.50	2.50	2.45	2.40	2.45	2.40	2.40	2.40	2.60	2.60
1924.....	2.85	2.75	2.75	2.65	2.60	2.55	2.50	2.50	2.55	2.60	2.60	2.60
1923.....	3.00	3.00	3.25	3.25	3.25	3.25	3.15	3.00	3.00	3.00	2.75	2.90
1922.....	2.25	2.00	2.00	2.05	2.20	2.35	2.40	2.45	3.00	3.00	3.00	3.00
1921.....	4.15	3.90	3.70	3.60	3.30	3.00	2.70	2.35	2.30	2.40	2.30	2.30
1920.....	4.15	4.40	4.50	4.50	4.50	4.50	4.50	4.50	4.60	4.75	4.75	4.50
1919.....	4.40	4.20	4.20	3.70	3.70	3.70	3.70	3.90	3.90	3.90	4.00	4.05
1918.....	4.65	4.65	4.65	4.65	4.60	4.40	4.40	4.40	4.40	4.40	4.40	4.40
1917.....	4.25	4.25	4.50	4.75	5.05	5.25	5.25	5.25	5.25	5.25	5.00	4.65
1916.....	2.60	2.75	3.10	3.35	3.90	4.25	4.05	4.00	4.00	4.00	4.10	4.25
1915.....	1.45	1.45	1.45	1.45	1.45	1.50	1.50	1.50	1.60	1.75	2.30	2.45
1914.....	1.60	1.60	1.60	1.60	1.60	1.55	1.50	1.50	1.55	1.50	1.45	1.45
1913.....	2.20	2.20	2.20	2.20	2.15	2.15	2.10	2.00	2.00	1.90	1.80	1.75

Cast Iron Pipe, New York, 1915-1929

6-inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$38.85	$39.80	$39.80	$39.05	$38.20	$38.00	$37.90	$37.50	$37.50	$37.50	$36.75	$36.50
1928.....	37.15	36.75	36.75	37.25	37.65	38.25	38.08	37.60	37.60	37.10	37.20	38.60
1927.....	49.50	49.50	49.50	49.50	48.60	47.95	46.00	44.00	38.25	36.90	37.25	37.25
1926.....	51.50	51.50	51.50	52.75	51.50	51.50	51.50	51.50	51.50	51.50	51.50	51.50
1925.....	61.05	61.05	60.05	58.15	58.05	57.05	57.05	57.05	56.50	57.05	57.05	57.05
1924.....	66.10	66.10	66.10	66.10	66.10	65.10	65.10	64.10	64.10	64.10	62.10	60.60
1923.....	56.50	57.30	58.40	58.70	59.00	59.00	59.00	59.20	63.60	63.60	62.80	66.60
1922.....	47.30	47.30	47.60	48.80	48.80	49.80	53.30	54.50	55.30	55.30	55.30	55.30
1921.....	63.30	63.30	63.30	63.30	61.30	52.70	48.55	47.05	45.30	47.55	47.30	47.30
1920.....	67.30	70.30	71.30	73.30	76.30	76.30	76.30	76.30	77.20	77.20	77.20	77.20
1919.....	66.20	62.70	61.65	57.70	56.70	52.70	52.70	53.10	54.30	56.70	58.30	61.30
1918.....	55.35	55.35	55.35	55.35	56.55	61.35	62.30	62.50	62.70	67.50	67.70	67.70
1917.....	41.50	41.50	41.90	51.25	55.50	60.75	65.50	65.50	65.50	56.50	56.10	54.75
1916.....	29.00	29.40	29.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	34.50	41.00
1915.....	20.00	20.00	20.25	20.50	20.50	20.50	21.75	22.15	23.40	24.00	25.00	26.40

Cast Iron Pipe, Chicago, 1915-1929

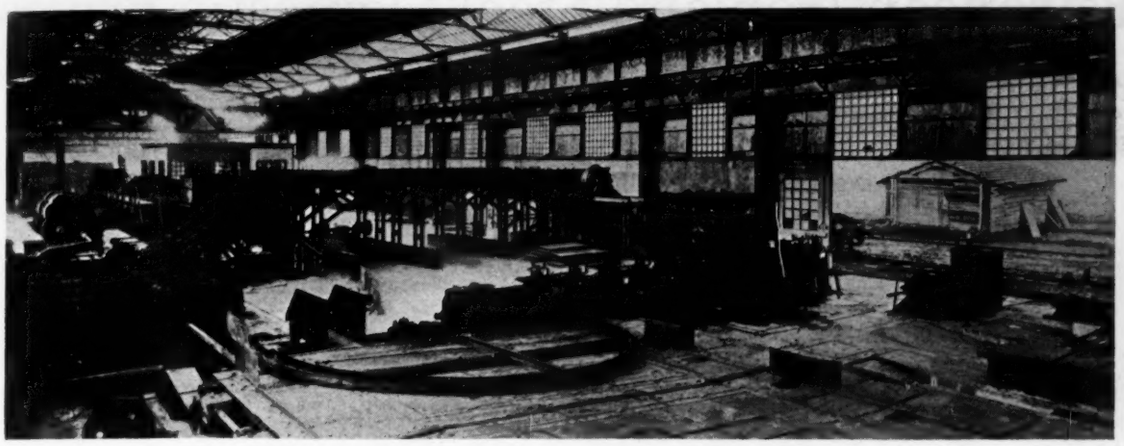
6-inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20	$45.20
1928.....	36.20	36.20	36.70	38.20	39.00	39.00	41.45	42.00	42.20	42.70	45.00	45.20
1927.....	45.70	43.70	44.00	44.20	43.20	42.80	42.20	38.95	36.20	34.30	35.30	35.30
1926.....	48.70	49.20	49.20	49.20	49.45	48.95	47.45	47.45	47.80	47.20	47.20	47.20
1925.....	49.00	50.20	48.20	46.10	46.95	47.95	48.20	49.20	49.45	49.20	50.20	50.20
1924.....	56.00	57.20	57.20	56.95	55.40	55.20	52.20	52.70	52.20	50.00	48.00	47.00
1923.....	51.20	53.20	53.70	55.20	57.20	57.20	59.20	60.45	59.20	57.95	56.85	59.20
1922.....	41.60	42.10	43.00	43.85	44.70	46.60	45.55	45.20	47.85	52.20	51.20	51.20
1921.....	64.10	64.10	64.10	64.10	64.10	51.50	47.60	44.35	42.90	42.60	42.60	42.60
1920.....	67.55	71.30	72.80	74.40	76.80	76.80	76.80	76.80	81.50	83.10	83.10	83.10
1919.....	64.30	61.80	60.55	56.80	54.80	51.80	52.60	54.80	55.80	59.80	59.80	63.80
1918.....	54.30	54.30	54.30	54.30	55.50	60.80	62.05	61.85	61.80	66.80	66.80	66.80
1917.....	41.00	41.50	43.70	52.50	55.50	60.75	65.50	65.50	65.50	57.75	52.10	53.50
1916.....	29.20	29.50	29.50	30.50	30.50	30.50	30.50	30.50	31.00	31.50	35.00	40.50
1915.....	23.40	23.00	23.00	23.00	23.00	23.00	24.00	24.00	24.70	25.75	26.90	27.90

Cast Iron Pipe, Birmingham, 1915-1929

6-inch and Larger

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1929.....	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00	$37.00
1928.....	29.00	29.00	28.50	30.00	33.50	31.00	32.50	34.00	34.00	35.00	36.40	37.00
1927.....	36.00	36.00	36.50	36.00	36.50	34.80	34.00	30.75	29.80	28.75	29.00	29.00
1926.....	42.00	41.25	40.24	40.00	50.00	40.00	40.00	40.00	39.40	40.00	39.00	38.00
1925.....	40.00	40.00	40.00	39.60	38.50	40.00	40.00	41.00	41.00	41.75	42.00	42.00
1924.....	46.80	47.50	48.00	48.00	48.00	48.00	47.00	47.00	45.00	44.40	46.00	40.00
1923.....	43.00	45.00	45.50	46.75	49.00	49.00	49.00	49.00	49.00	49.00	49.00	51.00
1922.....	35.00	34.00	33.00	34.15	34.70	37.00	37.00	37.30	40.00	43.00	43.00	43.00
1921.....	55.00	55.00	55.00	55.00	55.00	42.50	40.00	39.50	38.00	36.50	32.50	35.00
1920.....	60.00	64.50	66.00	67.00	70.00	70.00	70.00	70.00	72.40	74.00	74.00	74.00
1919.....	58.75	55.00	54.50	53.00	52.00	48.00	48.00	48.00	48.00	50.00	53.00	56.70
1918.....	49.00	49.00	49.00	49.00	50.20	55.00	55.00	55.00	55.00	60.00	60.00	60.05
1917.....	36.00	36.00	37.40	42.40	47.20	55.00	55.00	55.00	55.75	47.25	45.00	46.00
1916.....	24.00	24.50	25.00	25.00	25.00	25.00	25.00	25.50	25.50	25.50	28.40	35.00
1915.....	19.50	19.50	19.50	19.50	19.25	18.65	19.00	19.00	19.40	20.75	21.90	22.65



Semicontinuous Merchant Mill, Plant of Sesto S. Giovanni, Milano, Italy

European Market Reviews for 1929

Reports by Iron Trade Review
Staff Correspondents

Great Britain
Italy

Belgium and Luxemburg
Germany

France
Eastern Europe

European Iron and Steel Domestic Prices in 1929

At Works or Furnace

British Prices in Pounds Sterling Per Gross Ton

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
Foundry No. 3 pig iron, silicon 2.50-3.00	3– 6–0	3– 6–6	3– 7–0	3– 8–0	3– 8–9	3–10–9	3–12–9	3–12–6	3–12–6	3–12–6	3–12–6	3–12–6
Basic pig iron	3– 5–0	3– 5–0	3– 5–0	3– 5–9	3– 6–6	3– 8–6	3– 8–6	3– 8–6	3– 8–6	3– 8–6	3– 8–6	3– 8–6
Furnace coke	0–14–6	0–14–6	0–14–6	0–15–0	0–15–0	0–15–0	0–15–6	0–16–6	0–17–3	0–18–0	0–18–0	0–18–0
Billets	6– 3–9	6– 6–9	6– 8–6	6– 9–3	6–10–0	6–12–0	6–12–6	6–11–0	6– 8–3	6– 7–6	6– 5–6	6– 5–0
Standard rails	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 5–0
Merchant bars	7–15–0	7–15–0	8– 1–0	8–10–0	8–10–0	8–10–0	8– 8–9	8– 5–0	8– 5–0	8– 5–0	8– 5–0	8– 2–6
Shapes	7–17–6	7–17–6	7–17–6	7–17–6	7–18–9	8– 2–6	8– 2–6	8– 2–6	8– 2–6	8– 2–6	8– 2–6	8– 2–6
Plates, ship, bridge and tank*	8–12–6	8–12–6	8–12–6	8–12–6	8–13–9	8–17–6	8–17–6	8–17–6	8–15–0	8–17–6	8–17–6	8–17–6
Sheets, black, 24 gage	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0	10–10–0
Sheets, galvanized, 24 gage, corrugated	13–12–6	13–12–6	13–11–0	13–10–0	13–11–9	13–12–6	13– 9–4	13– 7–6	13– 7–6	13– 5–0	12–18–9	12–12–6
Plain wire	9–15–0	9–15–0	9–12–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0	9–10–0
Bands and strips	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0	10– 0–0

*Delivered.

German Prices in Marks Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry No. 3 pig iron, silicon 2.50-3.00	78	78	78	78	80	85	85	85	85	85	85	85
Basic pig iron	88	88	88	88	88.50	91	91	91	91	91	91	91
Furnace coke	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50
Billets	121	121	121	121	121	121	121	121	121	121	121	121
Standard rails	140	140	140	140	140	140	140	140	140	140	140	140
Merchant bars	141	141	141	141	141	141	141	141	141	141	141	141
Shapes	138	138	138	138	138	138	138	138	138	138	138	138
Plates, ship, bridge and tank	158	158	158	158	158	158	158	158	158	158	158	158
Sheets, black, 24 gage	225	225	225	225	225	225	225	225	225	225	225	225
Sheets, galvanized, 24 gage, corrugated	350	350	350	350	350	350	350	350	350	350	350	350
Plain wire	230	230	230	230	230	230	230	230	228	225	225	225
Bands and strips	164	164	164	164	164	164	164	164	164	164	164	164

French Prices in French Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry No. 3 pig iron, silicon 2.50-3.00	450	475	475	475	475	475	475	475	475	475	475	475
Basic pig iron	485	510	510	510	510	510	510	510	510	510	510	510
Furnace coke	150	150	150	155	160	160	160	160	160	168	168	168
Billets	590	590	590	620	620	620	620	620	620	620	620	620
Standard rails	810	810	810	810	810	810	810	810	810	810	810	810
Merchant bars	735	745	755	755	755	750	750	745	745	740	735	730
Shapes	700	700	700	700	700	700	700	700	700	700	700	700
Plates, ship, bridge and tank	855	855	855	855	855	855	790	800	815	820	815	810
Sheets, black, 24 gage	1620	1620	1620	1620	1620	1620	1595	1595	1595	1595	1550	1550
Sheets, galvanized, 24 gage, corrugated	2050	2050	2050	2075	2085	2050	2045	2045	2060	1970	1970	1970
Plain wire	1075	1075	1050	1075	1075	1075	1100	1075	1075	1075	1075	1100
Bands and strips	840	840	840	840	840	840	840	835	830	840	810	810

Belgian Prices in Belgian Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Foundry No. 3 pig iron, silicon 2.50-3.00	600	600	602	620	620	620	620	620	620	620	620	620
Basic bessemer pig iron	610	610	610	610	615	615	630	625	605	595	585	580
Furnace coke	185	190	200	210	210	210	210	210	210	210	210	210
Billets	885	885	935	945	945	925	875	880	885	890	890	890
Standard rails	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
Merchant bars	1090	1095	1085	1075	1065	1055	1050	1045	1005	970	960	945
Shapes	935	940	940	940	942	945	950	945	940	930	930	935
Plates, ship, bridge and tank	1120	1125	1125	1120	1120	1120	1135	1140	1130	1125	1120	1125
Sheets, black, 24 gage	1800	1950	2080	2080	2085	2100	2100	2040	2000	1905	1905	1900
Sheets, galvanized, 24 gage, corrugated	2950	2950	2950	2950	2950	2950	2750	2750	2750	2650	2425	2400
Plain wire	1600	1600	1600	1600	1635	1650	1650	1650	1650	1650	1650	1650
Bands and strips	1325	1340	1350	1335	1310	1300	1185	1175	1165	1100	1065	1050

Halt Comes in European Progress

Year Ends Less Hopefully Than It Started—Credit Facilities Are Needed To Stimulate Business—Production Exceeds World Demand

By Vincent Delport

European Manager, Iron Trade Review

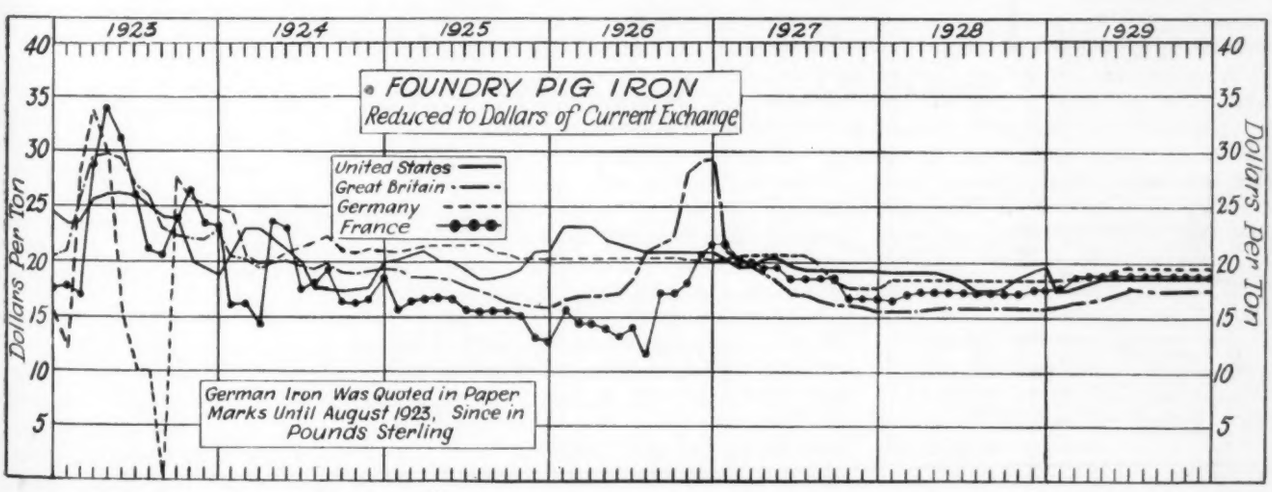
CLOUDING the end of a year which had begun with a promising outlook, uneasiness had spread over the greater part of Europe at the close of 1929. Credit restriction and the contraction of world demand have checked business progress. In the iron and steel trades particularly, these factors, associated with intense production, have forced prices down. Merchant bar quotations, which rose consistently throughout 1928, followed exactly the opposite course in 1929, the lowest level having been reached in November. The European steel entente decision to reduce production momentarily checked the downfall, which was further arrested by the concerted action of producers to fix a minimum price for bars.

The policy of the entente, and its results have proved the utility of this organization. All the more importance attaches to the future of the steel entente, whose first term of existence expires on March 31, 1930. While its fate is in the balance, there is no doubt that serious efforts will be made to overcome difficulties in order to ensure its continuation. It is the unanimous feeling that, even though the influence of the entente on markets is limited, its moral effects are precious. It has brought together the leaders of the European iron and steel industry and has created around them an atmosphere of understanding and goodwill, which is invaluable.

Great Britain, while not a party to the entente, has made fresh progress in following continental methods of organization. An important amalgamation of iron and steel interests was effected in the Middlesbrough district, and further developments in this direction are to be expected. Eventually the rational organization of the British iron and steel industry into four or five geographical groups can be visualized. During the past year, British trade held its own better than in 1928, but the outlook is clouded, owing to renewed difficulties in the coal mines and the heavier burden imposed by coming laws.

On the continent, Germany is severely handicapped by an increasing need of capital which, as yet, is out of her grasp. The German export trade was well maintained throughout the year, and expectations are hopeful provided that more ample funds be at the disposal of industry, and provided also that the organization of the various syndicates be not disrupted by internal strife. France has enjoyed a prosperous year and, more so perhaps than any other country, is entering the new year without serious cause for anxiety.

The other producing countries have preserved and, in some cases, improved their position. Owing to the necessity for Belgium to export the greater part of her production, that country has been particularly sensitive to the end-of-the-year depression. However, the position of the works is sound. For Europe generally, the coming year should be propitious, especially if the steel entente is renewed and if the present widespread financial difficulties are not too far-reaching.



European Iron and Steel Export Prices in 1929

F.o.b. Ports of Shipment

British Prices in Pounds Sterling Per Gross Ton

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry No. 3, Middlesbrough	3- 6-0	3- 6-6	3- 7-0	3- 8-0	3- 8-9	3-10-9	3-12-9	3-12-6	3-12-6	3-12-6	3-12-6	3-12-6
Basic, Middlesbrough	3- 5-0	3- 5-0	3- 5-0	3- 5-9	3- 6-6	3- 8-6	3- 8-6	3- 8-6	3- 8-6	3- 8-6	3- 8-6	3- 8-6
Scotch Foundry	3-10-0	3-10-9	3-12-0	3-12-6	3-12-6	3-12-6	3-12-6	3-16-0	3-16-0	3-16-0	3-16-0	3-16-0
Hematite, East Coast	3-11-0	3-11-3	3-13-0	3-14-0	3-14-0	3-14-0	3-14-6	3-15-6	3-16-0	3-16-0	3-17-0	3-17-0
SEMIFINISHED STEEL												
Billets	6- 5-0	6- 7-0	6- 8-6	6- 9-3	6-10-0	6-12-0	6-12-6	6-11-0	6- 8-3	6- 7-6	6- 5-6	6- 5-0
Wire rods	8-12-6	8-12-6	8-12-6	8-12-6	8-12-6	8-12-6	8-12-6	8-12-6	8-10-9	8-10-0	8-10-0	8-10-0
FINISHED STEEL												
Standard rails	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	8- 2-6	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0
Merchant bars	7-15-0	7-15-0	8- 0-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 5-0	8- 2-6	8- 0-0	8- 0-0
Structural shapes	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6	7- 7-6
Plates, ship, bridge and tank	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6	8- 2-6
Sheets, black, 24 gage	10- 0-0	10- 2-6	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0
Sheets, galvanized, 24 gage, corrugated	13-11-3	13-12-6	13-10-0	13- 7-6	13-11-3	13-12-6	13- 9-3	13- 7-6	13- 7-6	13- 5-0	12-18-9	12-12-6
Bands and strips	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0	10- 0-0
Plain wire, base	9-15-0	9-15-0	9-12-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0	9-10-0
Galvanized wire, base	13-10-0	13-10-0	13-10-0	13-10-0	13-10-0	13-10-0	13-10-0	14- 0-0	14- 0-0	14- 0-0	14- 0-0	14- 0-0
Wire nails, base	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0	11- 0-0
Tinplate, base box 108 pounds	0-18-0	0-18-0	0-18-0	0-18-3	0-18-6	0-18-6	0-18-3	0-18-6	0-18-9	0-19-0	0-19-0	0-19-0
Furnace coke	0-14-6	0-14-6	0-14-6	0-15-0	0-15-0	0-15-0	0-15-6	0-16-6	0-17-3	0-18-0	0-18-0	0-18-0
Ferromanganese††	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0	21-13-0

††Delivered Atlantic Seaboard duty-paid.

German Prices in Pounds Per Metric Ton

F.o.b. Rotterdam or Northern Sea Ports

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry No. 3, silicon 2.50-3.00	3- 6-0	3- 6-6	3- 8-0	3- 8-0	3-10-6	3-12-0	3-12-0	3-12-0	3-12-0	3-12-0	3-12-0	3-12-0
Basic bessemer	3- 5-0	3- 5-0	3- 5-0	3- 5-0	3- 6-0	3- 9-0	3- 9-0	3- 9-0	3- 9-0	3- 9-0	3- 9-0	3- 9-0
Hematite	3-10-0	3-10-6	3-12-0	3-12-0	3-12-3	3-13-0	3-13-0	3-13-0	3-13-0	3-13-0	3-13-0	3-13-0
SEMIFINISHED STEEL												
Billets	5- 0-0	5- 1-6	5- 4-0	5- 4-0	5- 6-6	5- 7-3	5- 7-6	5- 3-0	4-17-0	4-16-0	4-12-6	4-12-0
Wire rods	6- 5-0	6- 5-0	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 5-0	6- 4-6	6- 5-0	6- 5-0	6- 5-0	6- 5-0
FINISHED STEEL												
Standard rails	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0
Merchant bars	6- 4-0	6- 4-3	6- 3-3	6- 3-0	6- 0-3	5-19-6	5-17-6	5-15-0	5-13-0	5- 8-6	5- 3-9	5- 5-0
Structural shapes	5- 2-6	5- 2-0	5- 1-6	5- 2-0	5- 2-0	5- 2-6	5- 4-0	5- 4-0	5- 5-9	5- 1-6	4-18-9	5- 0-0
Plates, ship, bridge and tank	6- 6-0	6- 6-0	6- 6-0	6- 6-6	6- 6-6	6- 6-9	6- 7-0	6- 6-9	6- 3-0	6- 2-6	6- 4-6	6- 5-0
Sheets, black, 24 gage	11- 7-0	11- 7-0	11- 7-0	11- 7-0	11- 3-3	10-12-0	10-12-0	10-12-0	10-12-0	10-12-0	10-12-0	10-12-0
Sheets, galvanized, 24 gage, corrugated	15-12-0	15-12-0	15-12-0	15-12-0	15- 4-0	14- 0-0	14- 0-0	13-13-9	13-10-0	13-10-0	13-10-0	13-10-0
Bands and strips	6-15-0	6-15-0	6- 8-9	6- 7-6	6- 7-6	6- 7-6	6- 3-9	5-18-9	5-16-0	5-14-0	5-12-0	5-12-6
Plain wire, base	7-12-6	7-10-6	7-12-0	7-16-6	7-17-3	7-15-0	7-14-0	7-12-6	7-10-0	7- 8-6	7- 7-0	7- 6-0
Galvanized wire, base	9-18-0	10- 0-0	9-18-9	9-19-0	9-13-6	9-15-0	9-14-0	9-12-6	9- 7-6	9- 3-6	9- 0-6	9- 0-0
Wire nails, base	8- 7-6	8-10-0	8- 0-6	8- 4-0	8- 2-9	8- 4-6	8- 3-0	8- 3-0	8- 0-0	7-16-0	7-15-0	7- 7-6
Tinplate, base box 108 pounds	1- 8-0	1- 8-0	1- 8-0	1- 8-0	1-10-3	1-17-0	1-17-0	1-17-0	1-17-0	1-17-0	1-17-0	1-17-0
Ferromanganese	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0	15- 0-0

French Prices in Francs or Sterling Per Metric Ton

F.o.b. Channel Ports or Antwerp

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry No. 3, silicon 2.50-3.00	3- 6-0	3- 6-6	3- 8-6	3-10-6	3-12-0	3-12-0	3-12-0	3-12-0	3-12-0	3-10-0	3- 9-0	3- 8-0
Basic bessemer	3- 5-0	3- 5-6	3- 5-6	3- 6-9	3- 9-0	3-10-6	3-10-6	3-10-9	3-11-0	3-10-0	3- 8-0	3- 8-0
Hematite*	590	590	605	605	605	605	630	630	630	630	630	630
SEMIFINISHED STEEL												
Billets	5- 1-6	5- 3-3	5- 4-6	5- 7-0	5- 8-0	5- 8-0	5- 4-3	4-19-6	4-16-9	4-15-0	4-12-0	4-11-0
Wire rods	6- 5-0	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6
FINISHED STEEL												
Standard rails	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0
Merchant bars	6- 2-6	6- 3-6	6- 3-0	6- 2-0	5-19-3	5-18-9	5-14-6	5-13-0	5-10-6	5- 5-0	5- 4-3	5- 5-0
Structural shapes	5- 1-0	5- 1-0	5- 1-0	5- 1-6	5- 2-6	5- 4-9	5- 4-6	5- 3-6	5- 1-6	5- 0-0	4-18-9	4-17-9
Plates, ship, bridge and tank	6- 5-6	6- 5-6	6- 5-6	6- 6-0	6- 6-0	6- 7-0	6- 7-9	6- 6-6	6- 5-0	6- 5-0	6- 4-6	6- 4-0
Sheets, black, 24 gage	10 -6-3	10- 5-0	10- 6-0	10- 5-0	10- 5-0	10-12-6	10-15-0	10-17-0	11- 0-0	10-18-9	10-15-0	10-15-0
Sheets, galvanized, 24 gage, corrugated	13-13-9	13-13-9	13-13-9	13-13-9	13-13-9	13-13-9	13-13-9	13-10-9	13- 6-3	13- 6-3	13- 2-6	13- 1-3
Bands and strips	6- 5-0	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	5-19-6	5-18-6	5-15-0	5-13-0	5-12-6	5-12-6
Plain wire, base	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-13-9	7-10-0	7-10-0	7- 8-9	7- 5-0	7- 4-0	7- 0-0
Galvanized wire, base	9-15-6	9-17-6	9-17-6	9-13-9	9-12-6	9-12-6	9-12-6	9-12-6	9-10-0	9- 2-6	9- 1-3	8-10-0
Wire nails, base	8- 3-0	8- 3-9	8- 3-9	8- 2-9	8- 2-6	8- 2-0	8- 0-0	8- 0-0	7-19-6	17-17-6	7-16-3	7- 0-0

*French francs

Belgian Prices in Sterling Per Metric Ton

F.o.b. Antwerp

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
Foundry No. 3, silicon 2.50-3.00	3- 6-0	3- 6-6	3- 8-6	3-10-6	3-12-0	3-12-0	3-12-0	3-12-0	3-12-0	3-10-0	3- 9-0	3- 8-0
Basic bessemer	3- 5-0	3- 5-6	3- 5-6	3- 6-9	3- 9-0	3-10-6	3-10-6	3-10-9	3-11-0	3-10-0	3- 8-0	3- 8-0
SEMIFINISHED STEEL												
Billets	5- 1-6	5- 3-3	5- 4-6	5- 7-0	5- 8-0	5- 8-0	5- 4-3	4-19-6	4-16-9	4-15-0	4-12-0	4-11-0
Wire rods	6- 5-0	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6
FINISHED STEEL												
Standard rails	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0	6-10-0
Merchant bars	6- 2-6	6- 3-6	6- 3-0	6- 2-0	5-19-3	5-18-9	5-14-6	5-13-0	5-10-6	5- 5-0	5- 4-3	5- 5-0
Structural shapes	5- 1-0	5- 1-0	5- 1-0	5- 1-6	5- 2-6	5- 4-9	5- 4-6	5- 3-6	5- 1-6	5- 0-0	4-18-9	4-17-9
Plates, ship, bridge and tank	6- 5-6	6- 5-6	6- 5-6	6- 6-0	6- 6-0	6- 7-0	6- 7-9	6- 6-6	6- 5-0	6- 5-0	6- 4-6	6- 4-0
Sheets, black, 24 gage	10- 6-3	10- 5-0	10- 6-0	10- 5-0	10- 5-0	10-12-6	10-15-0	10-17-0	11- 0-0	10-18-9	10-15-0	10-15-0
Sheets, galvanized, 24 gage, corrugated	13-13-9	13-13-9	13-13-9	13-13-9	13-13-9	13-13-9	13-13-9	13-10-9	13- 6-3	13- 6-3	13- 2-6	13- 1-3
Bands and strips	6- 5-0	6- 7-6	6- 7-6	6- 7-6	6- 7-6	6- 7-6	5-19-6	5-18-6	5-15-0	5-13-0	5-12-6	5-12-6
Plain wire, base	7-15-0	7-15-0	7-15-0	7-15-0	7-15-0	7-13-9	7-10-0	7-10-0	7- 8-9	7- 5-0	7- 4-0	7- 0-0
Galvanized wire, base	9-15-6	9-17-6	9-17-6	9-13-9	9-12-6	9-12-6	9-12-6	9-12-6	9-10-0	9- 2-6	9- 1-3	8-10-0
Wire nails, base	8- 3-0	8- 3-9	8- 3-9	8- 2-9	8- 2-6	8- 2-0	8- 0-0	8- 0-0	7-19-6	7-17-6	7-16-3	7- 0-0

British Trade Is Making Progress

Steel Output Increased But Still Below Capacity—Important Advance Made in Amalgamation Process—Marked Increase of Exports

By J. A. Horton

British Correspondent, Iron Trade Review

STEADY progress characterized 1929 in the British iron and steel industry. It is much more stable than twelve months ago, and the outlook for 1930 is more encouraging. There have been no industrial disputes to hold up operations in any producing center of Britain, and the change of government from conservative to labor has not yet brought any of the dire results prophesied by gloomy spirits. The subject of safeguarding, which a year ago was the all-important topic, has faded into the background, largely because the new government is definitely opposed to any such measure. Unemployment on a large scale still is a serious factor, and development schemes are being formulated to provide work. These include electrification and other plans for the home railroads. J. H. Thomas, the prime mover in this matter, is advocating the use of steel sleepers on British lines. This idea alone would mean a substantial tonnage for some steelworks on the northeast coast and in South Wales which are equipped for this class of manufacture.

On the other hand, a bill now is before parliament which purports to extend the benefits accruing to workmen under the unemployment insurance regulations. This bill is disquieting to industrial leaders, who will see their financial burden further increased. Considerable uncertainty also prevails concerning the existing duty on automobiles. It is believed the present government would gladly do away with all duties. It is feared that if imports again become free, the automobile industry, which is a large consumer of steel, will suffer considerably and will see its activities reduced. However, whatever may be in store for the future, the iron and steel trades have improved their position in the past year.

More Furnaces in Blast

Production was on a comparatively high level in the ten months ended October. The average monthly output was greater than in 1928, both in pig iron and steel, although it has to be remembered that the amount of idle capacity still is considerable. During the year the pig iron furnaces in blast increased from 136 to 166, but most of the relighting took place on the northeast coast. In the Midland district, covering the area of Derbyshire, South Staffordshire, Northamptonshire, Leicestershire and Nottinghamshire, demand for pig iron, while sufficient to absorb the whole of the output, did not warrant any relighting. Apart from minor fluctuations, production of pig iron expanded steadily from 563,900 tons in January to 688,700 tons in October, giving a monthly average of some 631,000 tons, compared with 550,900 tons in 1928.

In steel production improvement was more marked, the 1929 monthly average being 817,850 tons, against 710,400 tons for 1928. January's total in 1929 was 764,600 tons. In March there was a sharp increase to 859,900 tons, which was the heaviest monthly total recorded until October, when the output was 889,800 tons, the highest for the year and since March, 1927.

Overseas trade expanded in a satisfactory way. Exports of iron and steel, including scrap, in the ten months January to October, 1929, totaled 4,039,451 tons, compared with 3,775,671 tons in the same period of 1928. Imports declined during the same period from 2,530,199 tons in 1928 to 2,356,023 tons in 1929. The tonnage of pig iron shipped abroad up to the end of October, 1929, was 76,684 tons, as against 46,463 tons, striking evidence that Britain is regaining her hold on the world's pig iron markets.

Middlesbrough takes a large share of the trade in exporting pig iron, and the fluctuations in the monthly exports from that port are rather remarkable. In January the total was 10,812 tons; the highest point was reached in May with 21,057 tons; it reduced to 10,349 tons in September, and again rebounded in October to 16,877 tons. A curious feature of the Middlesbrough trade is that while France, Belgium and Germany are among the biggest consumers of east-coast hematite, makers in those countries sold iron to Middlesbrough whenever the continental price was competitive, and toward the end of the year imports increased, owing to the low values on the continent.

Evidence of the recovery of the British export trade in coal is found in statistics for October, which showed that 5,760,628 tons left British shores, the highest monthly figure for the past six years. For the ten months

British Business Progress in 1929

(Gross tons 000 omitted)

	Production				Imports			Exports		
Monthly Ave.	Coal	Pig iron and ferro-alloys	No. furnaces in blast*	Steel ingots and castings	Iron ore	Pig iron and ferro-alloys	Steel†	Coke	Pig iron and ferro-alloys	Steel†
1913.....	23,951	855	338	639	603	18.0	168	..	93.7	320
1926.....	10,253	205	78	300	172	41.0	271	31	26.1	223
1927.....	20,936	608	149	758	430	50.7	316	67	27.5	322
1928.....	19,814	551	132	710	370	9.9	231	133	37.9	317
1929										
Jan.....	22,432	564	139	765	488	13.0	231	171	49.4	372
Feb.....	21,060	520	140	775	313	8.7	151	133	48.6	331
March...	22,587	590	145	860	462	8.7	173	172	44.7	305
April.....	20,871	611	152	809	467	9.2	253	120	46.7	293
May.....	20,689	655	159	844	489	7.6	250	102	68.1	375
June.....	19,882	658	165	831	411	11.4	223	119	40.9	266
July.....	21,105	672	167	805	481	9.1	228	128	42.3	333
Aug.....	20,538	682	170	753	576	10.0	245	135	45.1	313
Sept.....	20,890	665	168	848	530	16.9	212	156	37.5	262
Oct.....	.....	689	166	890	562	19.3	229	162	42.7	348
Mo. avg..	21,117	631	157	818	478	11.4	219	140	46.6	320

*Average for 1913; on last day of year or month for subsequent figures.
†Includes iron castings, but scrap excluded.

the total was well over 8,000,000 tons more than in the corresponding period of 1928. Most of the increase took place with continental consumers.

A matter of supreme importance was the upward movement in prices. Early in the year the relighting of furnaces and the increased exports of coke proved to be a great strain on the productive capacity of coke ovens. Idle plant was brought into operation, but even so there still is anxiety among furnacemen regarding supplies of metallurgical coke. Naturally, they have to buy heavily in advance, as it takes 1½ tons of coke to make a ton of pig iron. Coke prices increased considerably during the year. This was bound to react on pig iron, and all qualities appreciated in sympathy. Early in the year the Midland makers of pig iron formed themselves into the Central Pig Iron Producers association. Its main object is avowedly to place prices on a more profitable basis and also to stop cut-throat competition among merchants by fixing the price at which the latter should deliver within specified zones or areas. The scheme has been attended by success and has worked smoothly since its inception. The difference in price of pig iron today varies between 6s and 8s, according to the brand, as compared with January, 1929.

Little Change in Steel Prices

Unfortunately for steelmakers there was no corresponding advance in steel. The price of billets is practically the same as it was a year ago. Heavy steel, such as plates, sections, angles, beams, etc., is price-controlled by the Steel association. As compared with a year ago, these prices are 5s dearer, but there have been several efforts during the last few months to place values on a more remunerative basis. It is clear, however, that at the meetings which have taken place there have been two strong bodies of opinion pulling against each other, the one in favor of an advance, and the other content to leave prices unchanged in the hope that thereby trade might be fostered.

Another obstacle to higher steel prices has been the low values current on the continent. In the summer and autumn the continental makers reduced prices for semifinished and finished steel to an extraordinarily low level, much to the alarm of British makers, especially in South Wales.

With regard to individual sections of the trade, there was a marked falling off in inquiry for galvanized sheets toward the end of the year, resulting in a gradual fall in selling prices. The manufacturers, however, were helped by the fall in the value of spelter and sheet bars, the two main constituents. Activity in the tin plate trade was well maintained, though the restriction scheme necessarily keeps a certain number of mills idle.

Financially, British industry received several shocks in the fall of the year, first by the collapse of the Hatry group, followed shortly afterward by the crashes on Wall Street. There was widespread disappointment among British industrialists when the bank rate was increased on Sept. 26 from 5½ to 6½ per cent, as it was believed that the flow of trade would receive a check. But the rise was short-lived; by Oct. 31 it was back at 6 per cent, and on Nov. 21 it was reduced to 5½ per cent following the lowering of the New York discount rate. Periods of prosperity have always been associated with cheap money, and the view is widely held that if solid progress is to be made, a 4½ per cent rate would be more in keeping with the situation.

Another step in the rationalization of the steel industry is the scheme of amalgamation decided upon after long negotiations between the two Tees-side firms of Dorman, Long & Co. Ltd., and Bolckow, Vaughan & Co. Ltd. Dorman, Long's are known the world over for their structural business, having to their credit the finest bridges built in many parts of the world. The shareholders of both companies have given their consent to the merging of these two large interests as being highly important to the British steel trade. Between them there is an enormous capital and productive capacity. Reorganization is in progress in the shipbuilding firm of William Beardmore & Co. Ltd., and other mergers are foreshadowed. The spirit in which the heavy steel industry is facing up to its responsibility is indicated by Sir Arthur Dorman in the following words: "I am convinced that if Britain stands alone and reorganizes her abundant natural resources, she will be able to withstand all foreign challenges."

Foreign Competition Active

More widespread use of steel in the future is anticipated. In building construction it is being used to a larger extent; rolling-stock makers are being urged on all sides to build their freight and passenger cars of steel, especially from the point of view of safety in accidents. If the British railroads replace their obsolete rolling stock, rebuild stations and bridges, and reorganize as they ought to do, much of the idle capacity in the steel trade would find work. Builders of rolling stock in the Birmingham district maintained activity during the year chiefly with orders placed by the Colonies and Dominions, particularly South Africa, although competition from continental firms was severe. South African railways recently placed some heavy orders for tires and axles with Sheffield firms. The production of railway equipment for many years has been a specialty of Sheffield, which possesses enormous plants capable of expeditious manufacture. But in recent years this plant too often has been idle. Continental competition, it is true, was partly responsible, but the British railroads have receded into the background as buyers, as they have set up additional productive capacity on their own account.

British Iron and Steel Exports

(Gross Tons)

Principal commodities	(First nine months) 1929	1928	1927
Pig iron	352,961	280,985	180,136
Ferroalloys	70,328	39,360	42,592
Ingots	1,323	1,170	2,154
Semifinished steel, bars, shapes and wire rod	272,118	231,522	278,487
Special and tool steel	2,842	3,444	4,025
Bands, hoops and cold-rolled strip	44,553	45,062	36,515
Plates and sheets, black and galvanized	943,833	898,331	953,933
Tin, terne and coppered plates	427,940	404,191	364,124
Wire products	95,088	95,500	81,762
Wire nails, screws, nuts and bolts	40,589	38,952	38,258
Rails and track material	284,230	387,116	401,378
Tires, wheels, axles and other material	73,575	99,610	100,532
Constructional steelwork	61,482	59,298	87,852
Cast iron pipes and fittings	99,401	79,874	86,307
Other iron castings	19,745	18,933	17,394
Cables, chains and anchors	12,896	10,886	12,709
Forged tubes, bedsteads, hollow-ware	249,383	212,823	198,374
Hardware	129,542	119,101	117,579
Miscellaneous	221,998	218,576	177,570
TOTAL	3,403,827	3,224,834	3,181,681
Scrap	346,447	243,072	186,722
TOTAL, including scrap	3,750,274	3,467,906	3,368,403

Germany Awaits Domestic Revival

Output Higher Than in 1928—New Plant Replaces Obsolete Works—Increased Exports Make Up for Domestic Slackness

By Dr. E. H. Regensburger

German Correspondent, Iron Trade Review

BEGINNING just after the settlement of the labor conflict in the Rhenish-Westphalian iron and steel district, the year 1929 terminated in Germany in a state of depression. The country generally suffered from the general shortage of money, mainly on account of the fact that credit obtainable from the United States was considerably restricted. During the first ten months of the year, Germany was only able to contract long-term loans abroad aggregating 331,000,000 marks ($79,000,000), while for the whole of 1928, 1,549,000,000 marks ($370,000,000) were obtained. Building activities were greatly hampered by this factor. Reluctance on the part of domestic consumers was increased by the unsettled political situation with regard to the solution of the reparations problem, which impended during the greater part of the year, and the recent collapse of a large insurance concern added its effect to the general feeling of despondency. The railroads, which usually are the largest consumers and which in 1928 placed orders with the German industry to the amount of 1,500,000,000 marks ($355,000,000), considerably limited their orders, owing to lack of capital, and corporations and municipalities were similarly placed. Another depressing influence was the decreased purchasing power of the farmers.

Notwithstanding these unfavorable conditions, the position of the producers was strengthened by an increase of exports, which during the year advanced by 12 per cent over the 1928 figures. The German production of iron and steel for the year 1929 exceeded that of the previous year, the pig iron output being estimated at over 13,000,000 metric tons, as compared with 11,800,000 tons in 1928, and the production of raw steel being about 16,200,000 tons, as against 14,500,000 tons. The production of rolled products is estimated at 12,500,000 metric tons, as compared with 11,560,000 tons in 1928. It should be noted, however, that this increased output is largely due to the fact that a substantial deficiency was experienced at the end of 1928, owing to the iron and steel lockout.

In 1929 a number of new furnaces and mills were started, including two blast furnaces and a merchant bar rolling mill by the United Steel Works Corp., two blast furnace stacks and a basic bessemer steel plant at the Mannesmann works, and two blast furnaces at the Krupp works.

Notwithstanding the difficulties which the industry had to encounter during 1929, the financial results of the leading iron and steel concerns showed an improvement over the 1928 figures. Only one of the leading producers so far has cut its dividend, from 10 to 7 per cent, this company being the Maximilianshuette, and its action is the result of the fact that the control has been acquired from the Roechling group by a syndicate composed of Darmstadter and Nationalbank, Charlottenhuette, Deutsche Bank, and Otto Wolff.

The Vereinigte Stahlwerke A. G., or the United Steel Works Corp., experienced a satisfactory year, and it is understood that the concern is in a position to raise its dividend from 6 to 7 per cent, although it is not likely that this step will be taken. The activities of the concern during the fiscal year ended Sept. 30, 1929, are summarized in the following table:

	1928/29	1927/28	1926/27
	(Million marks)		
Total sales	1,433	1,438	1,417
Domestic sales	904	958	973
Export sales	529	480	444
	(000 metric tons)		
Pig iron	6,008	6,519	6,351
Raw steel	6,420	6,945	6,838
Coal	27,492	26,455	26,081
Coke	9,604	9,415	8,205

The figures show that it was almost possible to make up for the decline in domestic business by increased exports. For the first nine months of 1929, the percentage of export sales to total sales of the concern advanced from 33 per cent in 1928 to 37 per cent. The number of workers in the iron and steel plants of the United Steel Works Corp. showed a loss, but the number of coal-miners increased in accordance with the growing output of coal. The tonnage of unfilled orders of the corporation on Sept. 30, 1929, was 28 per cent less than the monthly average of 1927-28.

During the first ten months of the year, German production registered an increase generally, as can be seen from the accompanying table. The increase is particularly noticeable in

German Business Progress in 1929

(Metric tons 000 omitted)

Mo. Ave.	Production* Coke	Pig iron and ferro-alloys	No. fur-† naces in blast	Steel ingots and castings	Imports‡ Pig iron and ferro-alloys	Steel§	Exports‡ Coke	Pig iron and ferro-alloys	Steel§
1913....	2,532	910	...	994	11	41	534	71	470
1926....	2,188	804	109	1,028	9	96	615	43	403
1927....	2,688	1,092	116	1,359	24	218	733	30	348
1928....	2,822	985	101	1,210	26	174	740	25	395
1929									
Jan.....	3,018	1,098	97	1,470	22	154	798	32	388
Feb.....	2,829	982	96	1,270	11	101	628	21	320
March..	3,339	1,061	97	1,314	12	112	845	27	319
April....	3,132	1,105	99	1,415	13	142	818	36	584
May.....	3,133	1,133	104	1,421	11	159	826	44	543
June....	3,147	1,164	103	1,430	12	165	783	36	486
July....	3,332	1,204	103	1,466	13	165	1,001	48	498
Aug.....	3,364	1,168	96	1,402	11	154	1,030	46	474
Sept.....	3,264	1,109	100	1,231	12	136	1,056	36	434
Oct.....	3,379	1,157	102	1,377	..	..	....	..	...
Mo. ave.	3,194	1,118	100	1,380	13	129	865	36	450

*Figures for 1913 are for Germany in her present boundaries.
†On last day of year or month.
‡Figures for 1913 for pre-war boundaries and include Luxemburg.
§Includes iron castings and scrap.

regard to coke, and the production of coal and lignite also augmented. It is of interest to note that the increase in the earnings of many heavy industrial concerns was due in part to the profit on the sales of coal, which helped to offset the smaller receipts from iron and steel.

Owing to reduction of domestic demand, producers were induced to push their export sales, notwithstanding the severe competition experienced, mainly from Belgian makers. While this export business assisted the trade, profits were hardly satisfactory, owing to the continuous drop of world prices which was a feature of the iron and steel markets throughout the year. During the first nine months of the year, German exports of iron and steel, including scrap, totaled 4,370,978 metric tons, as compared with 3,905,153 tons in the corresponding period of 1928 and 3,489,001 tons for 1927. The low prices prevailing in the month of October amounted to 2,965,000 metric tons, as compared with 1,998,000 tons in the corresponding period of 1928 and 1,419,000 tons for 1927.

Domestic business during the greater part of the year was comparatively quiet. Following the long winter period, during which business was restricted, only a temporary revival was registered during the spring and summer months. Throughout the year, domestic quotations remained unchanged, despite the increase in wages which was granted to the workers at the end of 1928. Buying on the part of consumers was of a hand-to-mouth nature, and toward the end of the year, despite a restriction of the works' activities, stocks began to increase. In addition to the reduced buying on the part of the railroads and building industries, the shipyards and the machinery makers also restricted their orders.

The uncertainty which prevailed right up to the end of the year with regard to the prolongation of the various domestic and European syndicates was a factor of considerable importance, the influence of which was to increase the feeling of uncertainty. Early in the year the United Steel Works Corp. had made it known that it would only agree to the prolongation of domestic syndicates provided that all of them were renewed. Practically all iron and steel commodities are syndicated in Germany, the main exception being for light-gage sheets, with regard to which negotiations have been carried on for some time in order to form a syndicate. A crisis occurred at the time of the renewal of the pipe association, owing to the lack of agreement between the firms of Krupp and Mannesmann. The Mannesmann concern, having erected two new blast furnaces at Huckingen, discontinued buying raw material for the manufacture of its pipes from Krupp's. Krupp's, who already had started two blast furnaces at Borbeck, threatened to seek a new outlet for the steel which previously was bought by Mannesmann, by constructing a new pipe mill. The erection of this mill would increase competition between Krupp, Mannesmann and the United Steel Works Corp. However, toward the end of the year it was expected that an agreement would be reached between the concerns, and that Mannesmann and the United Steel Works Corp. would undertake to buy approximately 80,000 to 100,000 tons of steel annually from Krupp's for the next five years. In the event of this agreement materializing, the renewal of the pipe association would be secured, and this would pave the way to the renewal of the other domestic associations and also of the European entente.

In order to facilitate future negotiations, it has been agreed that all the existing domestic syndicates shall terminate on Jan. 31, 1930. That the continuance of the syndicate system is felt to be beneficial to the industry is indicated by Herr Kloeckner's statement that he did not believe that any producer would have the courage to object to the renewal of the associations. With regard to Germany's position in the European steel entente, the German representatives will argue for an increase of their quota, which at present is based on the figures of production for 1926. The Germans claim that their quota corresponds to only 79 per cent of their highest output, whereas the French quota corresponds to 99 per cent of the French record output. Germany still enjoys a special position in view of the fact that an export quota has been allowed her which, in any case, is not liable to any penalty. This quota, which was fixed at 315,000 metric tons per month at the beginning of the year, was increased in April to 330,000 tons. The German producers, however, claim that this export limit proves to be a handicap, as it prevents them from further pushing sales on foreign markets in order to make up for the reduction of domestic trade. Provided that this handicap be removed, the Germans are entirely in favor of the renewal of the European entente, and, in fact, they are anxious that the system should be further developed and that international sales organizations also should be arranged.

During 1929 Germany again became an exporter of pig iron, while in 1928

(*Concluded on Page* 120)

German Iron and Steel Exports

(Metric tons)

Principal commodities	(First nine months) 1929	1928	1927
Pig iron	290,446	174,697	267,320
Ferroalloys	35,825	30,076	31,535
Ingots and semifinished steel	347,051	417,419	265,627
Bars, shapes, hoops and bands	1,014,569	914,467	692,882
Plates and sheets, black and galvanized	500,241	315,993	412,732
Tin plates	21,305	26,099	21,647
Wire rod and wire products	463,186	405,657	398,819
Wire nails, screws, nuts and bolts	85,920	77,558	65,811
Rails and track material	330,341	429,944	283,627
Tires, wheels and axles	48,371	48,436	47,138
Constructional steelwork	67,776	34,841	48,358
Forgings and malleable castings	183,536	152,171	162,046
Cast iron pipe	88,298	67,824	61,296
Other iron castings, except malleable	135,593	112,893	100,638
Anchors, anvils, hammers, blocks, etc	6,011	5,706	4,994
Forged tubes	281,943	260,691	216,533
Boilers, reservoirs, etc	84,287	55,307	48,540
Hardware	32,808	30,551	30,125
TOTAL, including items not specified	4,191,520	3,718,498	3,298,456
Scrap and turnings	179,458	186,655	190,545
TOTAL, including scrap	4,370,978	3,905,153	3,489,001

induced the European steel entente to reduce the production of raw steel by 10 per cent as from Nov. 1. This action gave a new stimulus to the market, but competition continued so keen that export prices, although higher, still remained unsatisfactory.

In the period considered, exports of almost all commodities from Germany advanced, the principal exceptions being for semifinished steel, beams, tinplates, and railroad sleepers. Imports continued the decline which already had started in 1928. For the first nine months of 1929, German imports of iron and steel, including scrap, aggregated 1,406,315 metric tons, as against 1,907,642 tons in the corresponding period of 1928. For the period Jan. 1 to Sept. 30, 1929, the export surplus in respect of iron and steel

Steel Industry Thrives in France

New Government's Policy Favors Business—Further Advance in Iron and Steel Output—Comptoirs Maintain Stable Prices

By J. M. Leon

French Correspondent, Iron Trade Review

IN RECENT years industrial France was troubled by serious financial and political disturbances. Uncertainty continued to reign during the first half of 1928, but confidence became established, thanks to the intelligent policy of Raymond Poincare. The year 1929 opened with a bright outlook, and conditions generally were favorable throughout. In November some anxiety was experienced during the cabinet crisis, but as soon as it became known that Andre Tardieu was taking the reins of government, uneasiness disappeared. The program of the new premier covers the execution of considerable public works, and he has provided means for reducing industrial burdens, measures which should give a considerable fillip to industry. In short, 1929 has been a particularly prosperous year for the French industry, notwithstanding the industrial crisis which spread over the world as the year ended.

The iron and steel industry was particularly active. The average production of pig iron during the first ten months exceeded that of the corresponding period of 1928, which was a record year, and it is already assured that the 1929 output will exceed all previous figures. Last year's average monthly production was 872,000 metric tons, as compared with 832,000 tons in 1928 and 773,000 tons in 1927. The average monthly production of steel ingots and castings was 807,000 metric tons, as against 791,000 tons in 1928 and 692,000 tons in 1927. The number of active blast furnaces, which was 151 at the end of 1928, was 157 on Oct. 31, 1929.

Northern Districts Progress

The works of Alsace-Lorraine and the east were responsible for the greater part of that production. The output of the northern districts, however, is increasing, and competing against the other regions of France, particularly the center, with the exception of the districts of St. Etienne and Montlucon, which continue to specialize in the manufacture of alloy steels. Other centers of production of alloy steels are making progress in the Alps, where electric steel is being made, and also in the Saar district.

The output of laminated steel also was substantial, and all categories of products were sold in tonnages materially higher than in 1928. The statistics prepared by the comptoirs state that in the nine months ending Sept. 30 the wire rod syndicate registered a tonnage of 207,080 metric tons for the domestic market and 128,200 tons for export. In addition, 46,630 metric tons of wire rod manufactured in the Saar were registered. The A-products syndicate, which controls the sales of semifinished and structural steel, registered during the same period 618,250 metric tons of semifinished products and 321,876 tons of beams.

The various domestic comptoirs are indirectly under the influence of the European steel entente. The entente is due to expire shortly, and efforts are being made to continue its existence on a firmer basis. To obtain this end it is necessary to revise the quotas and certain clauses of the statutes.

Germany has requested that its present quota of 43.18 per cent should be raised to 48.28 per cent, the latter figure being based on the average production from Jan. 1, 1927, to July 31, 1929. It is probable, however, that the new quotas will be based on the capacity of production of the member-countries. Changes also will be made in the method of fixing penalties. Sub-committees are engaged in investigating these questions. In view of the fact that the term of the German syndicates expires March 31, 1930, it has been decided that the present term of the steel entente, which was due to expire at the end of 1929, shall be extended also for another three months, to March 31, 1930.

The International Rail-Makers' association was renewed for a period of six years at a meeting held in Brussels in March. It was agreed that the British crown colonies would be considered as part of the British domestic market, and that the penalty for excess output would be 10s per ton up to 35,500 tons and £1 per ton beyond that figure. It also was agreed that Germany could retire from membership if her domestic syndicates were not renewed in 1930.

In France, the export sales of rails is regulated by the terms of the IRMA. The regulations of the French A-products syndicate were modified in May, and as a consequence export sales of semifinished steel and beams became free. With regard to

French Business Progress in 1929

(Metric tons 000 omitted)

Mo. Ave.	Production* Iron ore	Coke†	Pig iron and ferro-alloys	No. fur-‡ naces in blast	Steel ingots and castings	Imports Coke	Pig iron and ferro-alloys	Steel§	Exports Pig iron and ferro-alloys	Steel§
1913.....	3,588	336	756	131	581	256	4.2	10	9	43
1926.....	3,269	314	786	155	702	463	4.1	12	59	265
1927.....	3,786	339	773	143	692	393	5.6	6.5	70	363
1928.....	4,084	367	832	155	791	447	4.9	9.7	53	339
1929										
Jan.....	4,535	385	904	157	842	438	2.1	9.2	47	343
Feb.....	4,001	360	782	157	743	401	3.9	12.3	41	322
March...	4,410	411	880	156	805	419	2.8	6.7	38	202
April.....	4,176	394	871	158	810	503	2.5	12.0	40	304
May.....	4,120	406	897	157	820	500	5.6	19.6	48	308
June.....	4,185	395	865	155	795	495	2.6	19.0	41	316
July.....	4,436	399	878	156	815	445	2.3	16.6	47	298
Aug.....	4,339	399	893	156	827	428	5.0	14.8	37	335
Sept.....	4,108	380	851	157	763	483	4.2	18.9	59	177
Oct.....	.....	...	894	157	846	...	...	...	...	...
Mo. avg..	4,257	392	872	157	807	457	3.4	14.3	44	289

*Production for 1913 is for France in her present boundaries.
†Coke production at the coal mines; in addition, the iron and steel works produce between 3,500,000 and 4,000,000 tons annually.
‡On last day of year; or month.
§Includes ingots, semifinished steel, all rolled products, forgings and scrap.

domestic trade, the comptoir booked a large tonnage of orders up to September. From that time inquiries for semifinished steel became scarce, and the works had to turn their attention to export business.

The French wire rod syndicate operated satisfactorily, and the occupation of its members was 110 per cent of that of 1928. However, about October, the export demand receded, especially as regards the Japanese market. This syndicate is dependent upon the international wire rod syndicate, which will be renewed next year provided that the German syndicates themselves are renewed.

Endeavors were made in France to form a syndicate of manufacturers of wire products, but owing to the exigencies of one firm, the plan has not yet materialized. Attempts to form a plate and sheet syndicate also failed, the main difficulty coming from to the fact that domestic price fixed by the comptoir for semifinished steel was too low, and producers were offering most of their output for export. The comptoir then increased the home price by 30 francs ($1.18) per ton, and a larger tonnage became available to domestic consumers. From April 30 to the end of the year the price of 2-inch billets was 620 francs ($24.50).

In the home market, wire products were in great demand during the first three quarters of the year, and the wire rod comptoir was able to place important tonnages, the basis price of 850 francs ($33.45) per ton, Thionville basis, being maintained throughout the year. This stability of prices was of great assistance to the trade. Sales of merchant steel and small shapes were considerable. The price of structurals and beams remained fixed by the comptoir at 700 francs ($27.50) per ton throughout the year. The special steel department enjoyed a year of prosperity, owing to the activities of the automobile industry.

French Iron and Steel Exports

(Metric tons)

Principal commodities	(First nine months) 1929	1928	1927
Pig iron	397,875	467,205	652,594
Ferroalloys	6,256	7,092	5,119
Ingots	27,850	43,587	42,270
Semifinished steel, bars and shapes	1,608,165	1,875,907	2,165,954
Special and tool steel	2,821	1,634	1,217
Wire rod	170,293	183,043	135,348
Bands, hoops and cold-rolled strip	71,624	90,784	69,294
Plates and sheets, black and galvanized	122,003	181,997	218,723
Flats	8,955	10,918	7,905
Tin, terne and coppered plates	22,025	16,916	23,264
Wire products	37,371	49,262	40,484
Wire nails, screws, nuts and bolts	44,676	40,825	38,748
Rails and track material	250,868	301,492	312,324
Tires, wheels and axles	16,321	14,936	15,495
Constructional steelwork	193,102	177,521	195,171
Cast iron pipe, colums, etc	223,398	207,261	255,825
Other iron castings	14,961	13,127	13,903
Cables, chains, anchors and barbed wire	13,065	18,124	15,238
Forged tubes, boilers, reservoirs	59,282	68,792	63,800
Hardware	31,276	26,813	27,405
TOTAL	3,322,187	3,797,236	4,300,081
Scrap and turnings	267,303	288,416	292,704
TOTAL, including scrap	3,589,490	4,085,652	4,592,785

the attitude of the manufacturers of special sheets, who wished to preserve their independence. Other domestic ententes gave good results. These include a comptoir for tubes, the pig iron comptoir, and a syndicate which handles the sales of such by-products as slag, etc.

Domestic Market Strong

Generally speaking, markets were satisfactory during the year. During the first quarter, business was hampered by the intense cold, which interfered with the working of certain plants, but as soon as the milder season came in all works operated to capacity. Merchants and warehouses completed their stocks. Manufacturers of rolled products found it difficult to obtain their requirements in semifinished steel. This was due in part

Up to the middle of the year, export business also was satisfactory. However, dating from the end of July, inquiry from foreign markets calmed down, and the expected autumn revival did not materialize. At the same time, export prices fell off considerably, bringing a corresponding decrease in domestic prices for those products which were not syndicated. Concrete bars, for instance, dropped from 720 francs ($28.45) per ton in the east to 680 francs ($26.75). Domestic trade, however, remained active, and at the end of the year many works could not offer delivery within less than two or three months, although in some cases order-books were not quite so well filled as during the spring. Taking the year as a whole, prices generally were satisfactory, and substantial profits are foreshadowed by most iron and steel manufacturers.

The French iron and steel industry has been and still is seriously handicapped by labor shortage, especially unskilled labor. A considerable number of foreign workmen have been imported, especially from Poland. Attempts have been made to draw British labor, but results have been negative. The French colonies also have supplied a contingent of native labor. Wherever conditions make it possible, women are employed to fill up the gaps. On the other hand, the index of the cost of living has been continually on the increase. The combination of this factor with the shortage of labor, and with the general prosperity of industry, has caused several advances in wages. There also were a few small strikes.

Iron Ore Extraction Increases

Supplies of raw material offered no serious difficulties, but the price of fuel and coke substantially increased. This has resulted in closer relations between the iron and steel industry and the collieries, and in many cases an amalgamation of interests has taken place, with the result that iron and steel works are more and more tending to control their coke supplies. In order to retain an adequate supply of scrap, the exportation of this commodity continued to be restricted. It is to be noted that the output of open-hearth steel in France is about 30 per cent of the total production. Scrap prices followed the same trend as steel prices. Iron ore extraction in France reached very high figures, the average monthly output being 4,200,000 metric tons.

The consumption of iron and steel products in France considerably increased during 1929. However, the per capita consumption still remains far below that which obtains in the United States. In order to stimulate consumption, a propaganda service was formed in October, 1928, with the co-operation of the Comptoir Siderurgique, la Chambre Syndicale des Entrepreneurs de Constructions Metalliques, and various other organizations. This office is called Office Technique pour l'Utilisation de l'Acier. It distributes literature showing how the use of steel can be extended, not only in its present utilization, but also in new directions. This office also has exhibited a film showing the manufacture of steel and its various uses. Last year efforts were principally di-

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Belgium Reacts To World Demand

Flourishing Conditions at Beginning Not Maintained—Belgium and Luxemburg Increase Production—Wages and Transportation Rates Higher

European Staff Special

DURING the best part of 1929 the prosperity which had characterized the Belgian iron and steel industry in 1928 continued. The domestic markets of the principal nations were generally flourishing, with the results that producers did not find it necessary to give so much attention as in the past to export business. On the other hand. conditions in export markets generally were satisfactory, and the demand from South America, India and the Far east was substantial, while conditions in China were less agitated than in 1928. Belgium, which is above all an exporting country, found its advantage in these favorable circumstances.

Up to the end of the year the Belgian iron and steel works operated to capacity, and the average monthly production of pig iron from January to October was 341,570 metric tons, against an average monthly output of 325,445 tons in 1928 and 312,620 tons in 1927. Oct. 31 58 blast furnaces were in operation, compared with 56 at the beginning of the year. The average monthly output of steel ingots and castings during the first ten months of the year was 347,650 metric tons, against the monthly average of 327,870 tons in 1928 and 309,040 tons in 1927. Production of laminated steel was 298,685 metric tons per month, compared with 281,125 tons in 1928 and 255,185 tons in 1927. In every case record production was reached during 1929, and in particular the output of laminated steel was double that of 1913. In the first nine months Belgian steelworks produced 228,415 tons in excess of their quota in the steel entente. With regard to wire rod, the average monthly production of Belgium in 1929 was 21,400 metric tons, of which about 15,800 tons were for the domestic market and 5600 tons for export.

Export Prices Deteriorate

At the beginning of the year, export prices were relatively high, and in February the price of merchant bars was £6 4s ($30) per metric ton f. o. b. Antwerp. This, however, was abnormally high and could not be maintained, and by July 1 the quotation had dropped to £5 17s 6d ($28.45). The price of beams was somewhat more stable, as although there is no official price-fixing organization, the market is more or less controlled by a tacit agreement; in fact, the price rose from £5 ($24.20) per ton in January to £5 5s ($25.40) in July. During first half the price of semifinished products was firm, and 2-inch billets, quoted at £5 ($24.20) in January, were as high as £5 8s ($26.20) in July, due mostly to substantial sales effected in Great Britain. From the middle of the year, however, a radical change was noticed in the tendency of quotations and in the aspect of the markets.

From the beginning of August, sales became more restricted, and the improvement which generally is expected in the fall did not materialize; on the contrary, business further depreciated. Order-books became depleted, and the transforming industries had to interrupt operations during one or two days a week at the beginning of November. There then was a slight revival during one or two weeks, but this was followed by renewed period of dullness. The cause of this crisis is ascribed to the tightness of money which prevailed in most countries, and which was crowned by the break of the New York market. At the same time, South America was under the influence of unsatisfactory crops of coffee and cocoa. The demand from Japan gradually became calmer, and Chinese consumers greatly restricted their orders. Belgian mills were able to considerably reduce their periods of delivery, and prices at the end of November fell to new low levels, the drop in quotations for bars being 20 per cent from the peak of the year, and 12 per cent of July quotations.

The various syndicates which already existed in 1928 strengthened their position and proved their utility, as well during the prosperous period at the beginning of the year as during the period of declining prices. In October, attempts were made to form a syndicate for beams and semifinished steel but these have not yet materialized. Changes were brought about in the organization of the pig iron syndicates. March 1 a new Franco-Belgo-Luxemburg comptoir was formed to control the sales of phosphorous foundry pig iron. This organization controls all sales in the Belgo-Luxemburg economic union, and competition between the members of this comptoir has been eliminated. There has been, however, a certain amount of competition on the part

(*Concluded on Page* 120)

Belgian and Luxemburg Business Progress in 1929

(Metric tons 000 omitted)

	Production					Belgium and Luxemburg			
		Belgium		Luxemburg		Imports		Exports	
Mo. Ave.	Coke*	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron and ferro-alloys	Steel ingots and castings	Pig iron	Steel‡	Pig iron	Steel‡
1913.....	294	207	206	212	111	48†	26†	1.4†	130†
1926.....	449	283	281	213	187	28	27	13.1	304
1927.....	450	313	309	228	206	32	28	11.3	387
1928.....	494	325	328	231	214	46	38	8.2	379
1929									
Jan.....	514	351	357	242	225	52	46	7.8	269
Feb.....	459	302	302	209	195	38	40	7.0	291
March...	521	334	349	237	221	54	38	8.8	398
April.....	500	336	342	235	226	60	45	7.2	428
May.....	517	348	340	248	230	71	47	4.9	344
June.....	494	342	349	242	219	58	31	9.7	646
July.....	506	347	356	250	235	75	41	7.9	359
Aug.....	504	348	365	251	238	57	35	12.5	362
Sept.....	488	347	347	240	224	56	30	14.0	428
Oct.....	499	361	369	259	242	..	..	...	...
Mo. ave..	500	342	348	241	226	58	39	8.9	392

*Production at the coal mines. †Belgium only. ‡Includes iron castings and scrap.

Italy Is Organizing Her Industry

National Union of Steelworks Formed to Control Industry and Purchase Raw Materials—Large Mergers Enable Rationalization

By Dr. Guido Vanzetti

Special Correspondent

AN EVENT of considerable importance for Italian industry took place in 1929, the final constitution of the Unione Siderurgica Italiana, or iron and steel consortium. This brings the solution to the important problem of the organization of Italian production. Up to recent years, the Italian iron and steel industry had been experiencing a series of ups and downs, owing to the constant strife between competing industrial groups. The result of these conditions was the disorganization of the markets, instability of prices, and an uneconomical distribution of products and materials between the various centers of the home market. The basic cause of this state of affairs was that in Italy the capacity of iron and steel production is in excess of the capacity of absorption of the domestic market.

The new consortium has for its object the amelioration of market conditions from two particular standpoints: In the first place, the improvement of technical methods by modernizing means of production and improving plant equipment, thus bringing about a reduction in production costs through rationalization of the works; in the second place, from the marketing standpoint, a special section of the consortium has been set up to combine collectively the purchases of raw materials such as fuel, ores, and scrap, and also to allocate the output of iron and steel according to requirements of the various districts.

Production Is Increasing

While this consortium was being organized, a number of individual iron and steel concerns amalgamated into larger corporations. Thus in Italy during the past year the process of rationalization of industry, as in other countries, has materially advanced.

At present production of the Italian iron and steel industry is organized so that it is sufficient to meet practically the entire requirements of the country. On the other hand, exports of Italian iron and steel are practically negligible. Production statistics show that Italian output of iron and steel now is progressing. While the output of raw steel in 1923, which was the first year of the present form of government, rose for the first time to over 1,000,000 metric tons, in 1928 the production was about 2,000,000 tons. During the first half of 1929, steel production amounted to 1,100,000 metric tons, as against 895,000 tons in the corresponding period of 1928.

For pig iron also progress has been marked. In 1923 the output of pig iron was 236,000 metric tons, while in 1928 it reached 507,600 tons. For the first half of 1929 the pig iron output was 342,000 metric tons, as compared with 204,500 tons in the first half of 1928, and for the complete year 1929 a distinct advance has been made over the previous year's figures.

Italian Production

(Metric tons)

Mo. ave.	Pig iron	Raw steel	Rolled steel
1926.....	42,785	148,265	.....
1927.....	41,225	132,880	.....
1928.....	42,300	163,595	.....
1929			
Jan.....	62,003	183,813	162,951
Feb.....	46,807	176,500	161,240
March.....	60,061	180,462	173,706
April.....	55,220	182,529	170,413
May.....	60,488	220,661	187,778
June.....	57,534	181,986	158,566
July.....	59,883	186,554	165,916
Aug.....	57,122	161,543	155,290
Sept.....	55,445	182,271	.....
Mo. ave.....	57,175	184,035	166,980

The fact that imports of iron and steel also augmented during the past year is an indication of the increase of activities of the Italian industries. During the first half of 1929, 98,000 metric tons of pig iron were imported, as compared with 56,000 tons in the first half of 1928. The tonnage of scrap imported in the first half of 1929 was 497,000 metric tons, as against 318,000 tons in the corresponding period of 1928. The increase of production associated with the increase of imports shows that domestic consumption has advanced, although the per capita consumption of steel in Italy is only 50 kilograms (110 pounds).

One might imagine that in a country like Italy, where coal supplies are inadequate, but where there is an abundance of hydraulic energy, the electric furnace would be considerably developed, especially in view of the pioneer work done by Major Stassano. However, the fact is that the electric furnace is used only for the manufacture of special steels to the amount of about 300,000 metric tons per year, and also for steel castings. The Societa Miniere di Cogne, which had installed electric blast furnaces with the object of treating its ore, which is of a very pure description, recently has radically modified its equipment and replaced it by coke blast furnaces. The pig iron then is treated in the bessemer converter, and the resulting steel is refined in the electric furnace. With the exception of this particular steelworks, all the steel manufactured in Italy for rolling and forging is made in the open-hearth furnace, generally with basic lining. It is to be noted that the generation of electric current by hydroelectric power is, nevertheless, progressing in Italy, but in view of the numerous new applications of electricity, producers of electric power find it possible to market the current at a more remunerative price than is offered by iron and steel producers.

Prices Generally Stable

While in 1928 iron and steel prices gradually reached a level which was in relation to the appreciation of the lira, during the past year prices remained practically stable. On the other hand, the price of raw materials has increased, and this has resulted in a certain disparity as regards profits. This trend, however, has not had a very great influence on the activities of the market.

Italian iron and steel manufacturers are looking on the coming year with a certain amount of confidence, as, with the exception of a few items, they feel sufficiently protected by their tariff. While it is possible that present conditions in the principal producing countries may develop into a general crisis which would incite competing nations to export their products to Italy, the reorganization of the Italian industry and the new spirit of co-operation that has been instilled by its leaders should enable the country to overcome such difficulties.

Eastern Europe Remains Steady

Czech Output Expands But Exports Contract—Austrian and Hungarian Plant Well Occupied—Polish Works Are Active

By Dr. Ing. J. Tille

Special Correspondent

CONDITIONS prevailing in the iron and steel industry of the manufacturing countries of central and eastern Europe remained throughout 1929 without any substantial change in comparison with the previous year, although a certain weakening of the iron and steel export market, corresponding to the tendency of world prices, was noted. The prices for domestic trade remained unchanged, but the volume of sales was somewhat smaller.

In comparison with 1928, Czechoslovakia last year registered an increased output of pig iron and raw steel, mainly owing to active trade conditions during first half. In second half the demand deteriorated in the home trade, and the decrease in the tonnage ordered was larger than is usually the case at that time of the year. The estimated output of pig iron in 1929 is about 1,600,000 metric tons. Twelve blast furnaces operated practically throughout the year. The output of raw steel was about 2,150,000 metric tons. It was noticeable that demand for rolled steel products was about 15 per cent lower than in 1928, whereas requirements in iron and steel castings considerably increased. Generally speaking, and due to better occupation of foundries and to increasing scarcity of scrap, demand for pig iron was larger than in 1928.

Iron and steel exports during 1929 were lower than in the preceding year, and this is ascribed to the general weakness of world markets. Sales of pig iron and rolled steel are in the hands of the Prodejna sdruzenych ceskoslovenskych zelezaren, the sales office of the United Czecho-Slovak Works at Prague, the membership of which remained on the same footing as in 1928. Practically all foundries and steelworks in Czechoslovakia are making additions to their works and reorganizing them, with a view to concentrating and rationalizing output. Although not an actual member of the European steel entente, Czechoslovakia is closely associated with that organization. There is no restriction whatever as regards the domestic market, but the Czech works have undertaken to limit their exports to a quota based on the annual figure of 432,836 metric tons, subject to an increase or a reduction in relation to the fluctuations in the aggregate quota of the European entente, which at the end of the year was fixed at 29,066,000 metric tons. The agreements which were previously passed with the neighboring countries regarding mutual territorial protection have remained in force.

In Austria, production of pig iron and raw steel in 1929 slightly exceeded the previous year's figures. Austria produced about 465,000 metric tons of pig iron and 645,000 tons of raw steel. As in Czechoslovakia, tonnages ordered toward the end of the year were slowly decreasing. In spite of this, however, the works were well occupied, and three blast furnace stacks operated throughout the year.

Hungary also increased its pig iron and steel production in 1929, and the output reached 360,000 metric tons of pig iron and 540,000 tons of raw steel. The steelworks were occupied up to 80 per cent of capacity.

In Poland, production of pig iron in 1929 was roughly 725,000 metric tons, and that of raw steel 1,460,000 tons. There again the output was higher than in 1928. The capacity of the works was utilized up to 80 per cent, and an average of 16 blast furnace stacks operated. During 1929 several important amalgamations were among the Polish works, of which the most important was the merger of the Bismarckhutte with the Kattowitzer A. G. fur Bergbau und Eisenhuttenbetrieb, including the "Silesia" foundry. About 50 per cent of the Polish steel industry is today under the control of the Harriman group. The Polish works are outside the European steel entente.

Conditions in the Rumanian and Yugo-Slav steel industry remained practically unchanged during the year. Rumania produced about 65,000 metric tons of pig iron and 150,000 tons of steel, while the figures for Yugo-Slavia were 15,000 tons and 30,000 tons respectively, these figures being practically the same as for 1928.

In Russia, production showed an upward tendency, as shown by the following figures which are given for the financial year beginning Oct. 1. In the year 1928-1929 the output of pig iron was 4,200,000 metric tons, an increase of 22.2 per cent over the previous year's figures, and the number of blast furnaces operating was 75, as against 68. The raw steel production in 1928-1929 was 4,800,000 metric tons, an increase of 14 per cent over the preceding year's figures. For the financial year ending Sept. 30, 1930, it is hoped to attain a production of 5,500,000 metric tons of pig iron about 6,000,000 tons of steel. It is interesting to note that the output of pig iron in Russia during the 12 months ending Sept. 30, 1929, reached 95.5 per cent of the 1913 output, while the production of steel exceeded the last prewar year's figures by about 12 per cent.

The fiscal year 1928-1929 was the first of the period of five years covered by the economic program of the Soviet government. It is claimed that during that first year the output of pig iron and steel exceeded the tonnage laid down. For the last year of the period, 1932-1933, the schedule provides for an output of 10,000,000 metric tons of pig iron and 10,400,000 tons of steel.

Production in Eastern Europe

(Metric tons 000 omitted)

	Czechoslovakia		Poland	
	Pig iron	Raw steel	Pig iron	Raw steel
Jan.	137	175	61.5	143
Feb.	112	156	48.6	119
March	138	181	59.9	126
April	141	191	61.0	125
May	147	187	63.7	120
June	143	191	58.3	117
July	137	190	65.7	113
Aug.	137	185	64.8	112
Sept.	130	180	....	....
	Austria		**Hungary**	
1st quarter	113	154	89.9	133
2nd quarter	119	168	94.4	138
3rd quarter	...	...	91.3	128

	Russia	
	Pig iron	Steel
First eight months	2,725	3,120

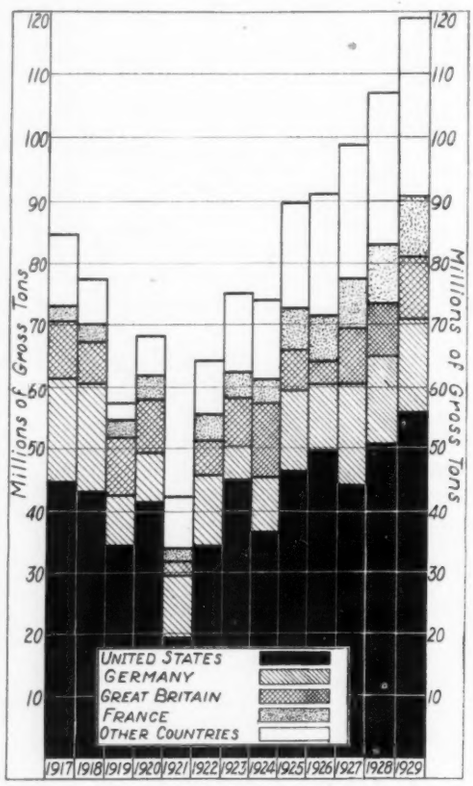
World Output Again Progresses

All Nations Participate—Steel Maintains Its Preponderance Over Pig Iron—Germany Regains First Rank in Exports

SINCE the disastrous year 1921 the world's production of steel has grown without a break. The pig iron output has followed the same trend, with only a slight setback in 1924. The year 1929 continued the progression at an increased pace, and this time there is hardly any country in the world that has not increased its output, with the possible exception of Australia and China, where strikes in the one case, and political disturbances in the other, checked the natural course of events. Last year's results more than confirm the forecasts made twelve months ago. The accompanying tables, which have been compiled by IRON TRADE REVIEW, through its world-wide connections, show that in 1929 the world produced about 97,000,000 gross tons of pig iron and 119,000,000 gross tons of steel ingots and castings, as compared with 86,981,000 tons of pig iron and 108,437,000 tons of steel in 1928, 85,590,000 tons of pig iron and 100,876,000 tons of steel in 1927, and 77,714,000 tons of pig iron and 74,687,000 tons of steel in 1913.

It is of interest to note that while in 1913 the output of steel was 4.06 per cent less than the output of pig iron, these conditions have become reversed since the war. In 1928 the production of steel was as much as 22.7 per cent in excess of that of pig iron. Last year the proportion was about 21.4 per cent. The total tonnage of steel produced in the world in 1929 was 8.73 per cent more than in the preceding year, and 59 per cent more than in 1913. The rate of increase of the United States was 12.07 per cent, as compared with 4.07 per cent, which was the percentage increase of 1928 over 1927. Last year, the United States contributed 47.2 per cent of the world's total, as against 47.5 per cent in 1928. In Europe the steel output advanced from 52,591,000 tons to 57,635,000 tons. Every European nation made progress. Among the more conspicuous was Germany, whose production increased by 13.4 per cent over that of 1928, at the end of which year the lockout brought about a substantial drop. Great Britain's advance of 15.2 per cent is all the more remarkable in that it was due to trade expansion alone. Russia's output increased by nearly 10 per cent, and Belgium's by 6 per cent. The aggregate output of the five countries which originally formed the European steel entente was about 34,700,000 tons, or 4,400,000 tons in excess of the total quota fixed by the entente. This authorized output was reduced by 10 per cent for the last two months of the year, and it is interesting to note that France, Belgium and Luxemburg reached their highest output on record in October, the month immediately preceding that when production was restricted. The peculiar situation arose that all the member-countries exceeded their quota last year; consequently, all had to pay penalties, which, in accordance with the statutes, were redistributed among the members in proportion to their output.

Last year's events have shown that the entente cannot actually limit output, and that producers prefer to incur the penalty to restricting production, as long as they can command a market. Of countries outside America and Europe, Japan made an advance of 19.5 per cent. India also progressed, but Australia was handicapped by a coal strike of several weeks' duration. The trend of the world's pig iron output was similar to that which has been indicated for steel. The increase over 1928 figures reached 12.6 per cent, showing, in fact, a higher rate than for steel, and considerably better progress than was registered in 1928. The United States, which produced 44.4 per cent of the world total, gained 14.7 per cent over its output of 1928, and was mainly responsible for the world's increase. The European countries also made some progress. France and Luxemburg, and India outside Europe, were the only countries that produced more pig iron than steel. The table of exports and imports of the principal countries shows the considerable ad-



COMPARISON OF STEEL TONNAGES BY PRINCIPAL COUNTRIES, SHOWING UNITED STATES PRODUCING SLIGHTLY BELOW HALF WORLD TOTAL

vance made by Germany in her foreign trade, her exports having increased by 18.5 per cent over 1928, while her imports decreased by 26.8 per cent. Last year Germany regained first place as an exporting country, a position which she had lost in 1927, when she was outranked by France. The latter country, on the other hand, receded by 12.9 per cent and was caught up by Great Britain, whose foreign trade slightly improved. Exports from Belgium and Luxemburg were practically on the same level as in 1928; imports, however, increased by 15 per cent. An improvement was registered in the United States, both from the standpoint of exports and imports. The combined exchange activities of the principal countries showed little change in comparison to 1928.

While 1929 has been a year of outstanding progress, as shown by the rate of increase of output and by the fact that practically all countries shared in the advance, it should be noted that production tended to slow down during the last two months of the year. This was due to the fact that the world demand was lagging, and this resulted in a depreciation of markets. The various reports published in this section show that most countries were more or less affected by unfavorable money conditions, which culminated in the Wall Street breakdown. Until the effects on the American public and American industry can be properly discerned, the prevailing uncertainty may check further advance of output. This state of affairs, however, should be momentary.

Allowing for the special circumstances of individual nations, there are many factors which should bring about industrial expansion, with a resulting call for iron and steel.

Table I

The World's Production of Iron and Steel

Before and Since the War—Gross Tons

Pig Iron

	1929	1928	1927	1926	1925	1924	1923	1922	1921	1913
United States	42,400,000	37,832,000	36,289,000	39,101,000	36,370,000	31,077,000	40,026,000	26,851,000	16,506,000	30,653,000
Canada	1,170,000	1,083,000	760,000	795,000	596,000	619,000	909,000	402,000	616,000	1,015,000
Great Britain	7,565,000	6,611,000	7,294,000	2,458,000	6,262,000	7,307,000	7,440,000	4,902,000	2,616,000	10,260,000
France	10,290,000	9,821,000	9,125,000	9,281,000	8,358,000	7,570,000	5,346,000	5,147,000	3,308,000	5,126,000
Belgium	4,035,000	3,843,000	3,692,000	3,345,000	2,501,000	2,798,000	2,114,000	1,587,000	858,000	2,445,000
Luxemburg	2,850,000	2,726,000	2,688,000	2,472,000	2,325,000	2,123,000	1,384,000	1,652,000	955,000	.....
Italy	675,000	500,000	487,000	505,000	474,000	299,000	232,000	155,000	60,000	420,000
Spain	720,000	570,000	603,000	479,000	520,000	489,000	394,000	207,000	341,000	418,000
Sweden	500,000	431,000	448,000	493,000	455,000	526,000	297,000	271,000	314,000	730,000
Germany	13,300,000	11,615,000	12,893,000	9,490,000	10,014,000	7,687,000	4,857,000	9,246,000	7,719,000	19,000,000
Austria	470,000	451,000	428,000	328,000	374,000	263,000	337,000	316,000	220,000	2,344,000
Czechia	1,600,000	1,515,000	1,241,000	1,071,000	1,147,000	967,000	804,000	330,000	568,000	.....
Poland	710,000	673,000	607,000	322,000	310,000	331,000	512,000	472,000	437,000	.....
Hungary	360,000	281,000	294,000	185,000	92,000	114,000	123,000	97,000	70,000	.....
Russia	4,000,000	3,322,000	3,290,000	2,395,000	1,521,000	746,000	379,000	183,000	112,000	4,563,000
Japan	1,500,000	1,500,000	1,263,000	1,160,000	917,000	820,000	796,000	691,000	646,000	236,000
China	300,000	300,000	300,000	400,000	380,000	200,000	175,000	180,000	126,000	239,000
India	1,350,000	1,052,000	1,145,000	902,000	888,000	877,000	614,000	340,000	371,000	204,000
Australia	450,000	410,000	550,000	442,000	439,000	416,000	330,000	84,000	352,000	47,000
Saar Territory	2,075,000	1,905,000	1,743,000	1,599,000	1,427,000	1,367,000	1,005,000	1,138,000	1,131,000	.....
Miscellaneous	560,000	540,000	450,000	350,000	300,000	250,000	110,000	100,000	75,000	100,000
WORLD TOTAL	96,880,000	86,981,000	85,590,000	77,573,000	75,670,000	66,801,000	68,184,000	54,351,000	37,401,000	77,714,000

Steel Ingots and Castings

United States	56,095,000	51,544,000	44,935,000	48,294,000	45,394,000	37,932,000	44,944,000	33,603,000	19,785,000	31,301,000
Canada	1,475,000	1,240,000	907,000	782,000	756,000	661,000	884,000	481,000	669,000	1,043,000
Great Britain	9,820,000	8,525,000	9,099,000	3,596,000	7,385,000	8,201,000	8,482,000	5,881,000	3,703,000	7,664,000
France	9,525,000	9,348,000	8,173,000	8,295,000	7,327,000	6,791,000	5,029,000	4,464,000	3,010,000	4,614,000
Belgium	4,105,000	3,872,000	3,645,000	3,320,000	2,508,000	2,829,000	2,260,000	1,540,000	752,000	2,428,000
Luxemburg	2,665,000	2,526,000	2,431,000	2,208,000	2,053,000	1,857,000	1,182,000	1,372,000	742,000	.....
Italy	2,150,000	1,932,000	1,570,000	1,752,000	1,757,000	1,337,000	1,124,000	966,000	689,000	919,000
Spain	950,000	788,000	653,000	598,000	616,000	531,000	456,000	230,000	394,000	238,000
Sweden	675,000	567,000	491,000	487,000	467,000	493,000	267,000	306,000	208,000	582,000
Germany	16,200,000	14,285,000	16,050,000	12,145,000	12,000,000	9,678,000	6,204,000	11,527,000	9,837,000	18,632,000
Austria	640,000	626,000	551,000	473,000	462,000	371,000	500,000	484,000	354,000	2,585,000
Czechia	2,150,000	2,000,000	1,662,000	1,316,000	1,476,000	1,200,000	984,000	640,000	903,000	.....
Poland	1,420,000	1,414,000	1,226,000	775,000	779,000	667,000	1,114,000	979,000	841,000	.....
Hungary	535,000	478,000	464,000	320,000	227,000	235,000	278,000	253,000	163,000	.....
Russia	4,600,000	4,190,000	4,150,000	3,087,000	2,087,000	1,122,000	713,000	351,000	311,000	4,181,000
Japan	2,200,000	1,840,000	1,658,000	1,475,000	1,279,000	1,106,000	973,000	932,000	901,000	300,000
China	30,000	30,000	30,000	50,000	50,000	50,000	50,000	50,000	47,000	100,000
India	570,000	410,000	575,000	520,000	449,000	335,000	215,000	150,000	183,000	.....
Australia	450,000	462,000	466,000	338,000	351,000	306,000	200,000	220,000	209,000	.....
Saar Territory	2,200,000	2,040,000	1,865,000	1,709,000	1,554,000	1,423,000	981,000	1,242,000	905,000	.....
Miscellaneous	330,000	320,000	275,000	125,000	225,000	175,000	175,000	125,000	80,000	100,000
WORLD TOTAL	118,785,000	108,437,000	100,876,000	91,898,000	89,202,000	77,300,000	77,015,000	65,796,000	44,686,000	74,687,000

German figures in 1913 are for pre-war territory. Austrian figures in 1913 include the major portion of Czechia and Hungary. Japan's figures include Manchuria and Korea.

Table II

Exports and Imports of the Principal Countries

Gross Tons—Scrap Eliminated

	Exports					Imports				
Country	1929	1928	1927	1926	1913	1929	1928	1927	1926	1913
United States	2,560,000	2,373,000	1,963,000	2,082,000	2,648,000	665,000	711,000	662,000	996,000	273,000
Great Britain	4,400,000	4,261,000	4,196,000	2,988,000	4,969,000	2,770,000	2,896,000	4,406,000	3,738,000	2,231,000
Germany	5,500,000	4,643,000	4,256,000	4,822,000	*6,200,000	1,470,000	2,010,000	2,215,000	1,038,000	*300,000
France‡	4,360,000	5,005,000	5,602,000	4,274,000	640,000	270,000	151,000	142,000	193,000	185,000
Belgium and Luxemburg	4,500,000	4,492,000	4,411,000	3,786,000	†1,550,000	1,015,000	882,000	638,000	560,000	†874,000
Total	21,320,000	20,774,000	20,428,000	17,952,000	16,007,000	6,190,000	6,650,000	8,063,000	6,525,000	3,863,000

*Includes the Saar and Luxemburg. †Belgium only. ‡Includes the Saar, except for 1913.

Belgium Responds to World Demand

(*Concluded from Page* 115)

of British pig iron makers, and on several occasions Middlesbrough pig iron has filtered through to the Ghent and Antwerp districts.

Throughout the past year the cost of living continued to increase, and gold prices tended to reach the same levels as in other European countries. As a result, demands for higher wages occurred several times in the iron and steel industries, and owing to the favorable circumstances, these demands were met. The National Railroad company of Belgium increased its tariffs, and as from March 1 the freight rates for heavy commodities were increased by 10 per cent, exception being made for coal, in which case the increase was 7 per cent for home trade, while no increase was enforced in the case of export trade. With regard to furnace coke, the increase in freight rates was 13.5 per cent in Belgian territory and 11 per cent in Luxemburg territory. These increases were reflected in costs of production, and producers further complained that where rebates were granted for export business, the Luxemburg producers were given the same advantages as themselves. Luxemburg producers are assisted by the fact that they are not subject to long hauls for the transportation of iron ore, whereas the Belgians have to obtain their ore from Lorraine.

In Luxemburg the iron and steel industry also experienced a satisfactory year, and production exceeded all previous limits.

There is a certain amount of uncertainty in regard to the future. This year has opened with decidedly calm markets, and Belgian and Luxemburg exporters are wondering what will be the effects of the stock exchange slump on American business, and they fear that American producers will find it necessary to adopt a more aggressive attitude on the world's export markets. In addition to this feeling, it also is noted that the German domestic market is far from being in a flourishing condition, and it is expected that Germany also will be compelled to seriously compete in export business. Owing to these conditions, it is feared that difficulties will increase, and that a new era of competition will develop. However, hopes are expressed that the formation of international selling syndicates may alleviate the danger, and serious efforts are being made to develop progress in that direction.

Belgian and Luxemburg Iron and Steel Exports

(Metric tons)

Principal commodities	(First nine months) 1929	1928	1927
Pig iron and ferroalloys	79,809	79,369	111,253
Ingots	26,397	23,891	17,045
Semifinished steel	320,859	453,158	700,230
Bars and shapes	1,557,160	1,365,868	1,472,647
Special steel	1,266	1,239	1,941
Wire rod and wire	293,978	205,318	141,686
Bands and hoops	132,023	101,374	82,913
Plates and sheets, black and galvanized, etc	499,766	463,367	413,242
Tinplates	230	2,171	1,137
Wire nails, screws, nuts and bolts	92,338	101,491	86,843
Barbed wire and fencing	27,962	28,555	29,834
Rails and track material	232,018	196,158	244,620
Tires, wheels and axles	13,199	13,041	12,624
Constructional steelwork	26,105	25,771	26,654
Cast iron pipe	25,306	25,012	32,378
Other iron castings	27,464	30,437	20,880
Cables and chains	2,648	2,227	1,943
Forged tubes	33,874	30,718	30,126
Hardware and sundries	37,177	34,284	44,469
TOTAL	3,429,579	3,183,449	3,472,465
Scrap	230,869	176,212	140,373
TOTAL, including scrap	3,660,448	3,359,661	3,612,838

Domestic Revival Need of German Trade

(*Concluded from Page* 112)

an import surplus was registered for pig iron. Exports in 1929 aggregated only about 3 per cent of the total output. For the first nine months of the year these exports of pig iron increased from 174,697 metric tons in 1928 to 290,446 tons in 1929. Shipments to Belgium, which is the principal country of destination, increased by about 100 per cent. No shipments were made to the United States. Imports of pig iron, on the other hand, declined from 237,179 metric tons in 1928 to 117,443 tons in 1929, due chiefly to restricted imports from France. On Oct. 31, 102 furnaces were in operation, as against 101 on Dec. 31, 1928, but the number of furnaces existing at the end of 1929 was 182, as compared with 184 at the end of 1928.

Imports of iron ore into Germany during the year were considerably in excess of the 1928 figures, although they did not come up to those of 1927. During the first nine months of 1929, iron ore imports totaled 12,684,239 metric tons, as against 10,700,750 tons in the corresponding period of 1928. The principal supplier again was Sweden. Shipments from that country increased by about 100 per cent; next came France and Spain. In August, the United Steel Works Corp. interest signed a contract with Grangesberg company for the delivery of over 10,000,000 tons of ore for the period 1933 to 1942. Foreign supplies of scrap further receded, but exports also declined. During the latter part of the year the scrap market became depressed in accordance with the falling activity of the iron and steel industry.

French Steel Industry in Thriving State

(*Concluded from Page* 114)

rected toward steel building, and several steel houses were erected and exhibited.

At the close of the year, iron and steel makers have been directing their attention to the coming negotiations relative to the new status of the Saar district. Although, according to the treaty of Versailles, the Saar was to be under the control of the League of Nations until 1935, it has been decided, following the Hague agreement, immediately to arrive at a definite understanding. This question is important for the French iron and steel industry, owing to the considerable interests which it holds in the Saar steelworks. Schneider and Arbed hold a part control of the Burbach works, the Acieries de la Marine holds a part control in the Dillingen and Saint-Ingbert works, the Acieries Nord et Lorraine owns an interest in the Neunkirchen works, Pont-a-Mousson in the Brebach works, de Dietrich & Co. in the Dingler-Karcher steelworks, and the tube works at Bous-sur-Sarre are controlled by French capital.

Notwithstanding the continued prosperity of the French iron and steel industry, it bears a heavy burden of taxation, and it is feared that the burden will be made heavier still by the new legislation, which provides for a considerable increase of the workmen's insurance scheme.

Foundries Turn Efforts Toward Quality

(*Concluded from Page* 23)

by individual effort certain promising new fields have been opened up for the product, especially in connection with highway construction. A further trend in the mechanization of the industry seems apparent, involving the substitution of electric for man power where possible."

Turning to the nonferrous side of the picture, the need has been seen for some sort of standardization of nonferrous alloys. It has been found that there are over 600 alloys in regular use, many varying only slightly in composition. Authorities in the field confidently believe that this number can be reduced to 25 or 30 without in any way diminishing the usefulness of such alloys. Work along these lines has been undertaken by the Nonferrous Ingot Metal institute and other technical organizations.

G. H. Clamer, president and general manager, Ajax Metal Co., Philadelphia, emphasizes the trend toward a better quality, saying, in part:

"There has been a decided trend toward the production of higher quality nonferrous ingots. This has been not merely a trend, but an actual accomplishment. The average quality of nonferrous ingots today on the market is, I feel confident, superior to that of a year ago, and decidedly superior to that of several years ago. Nonferrous ingots can be considered among the leading engineering materials of today. It is rarely necessary to sell the practice of using nonferrous ingot metals as substitutes for virgin ingot metals. Nonferrous ingots are cheaper than virgin metal mixtures, and in nearly every case, if properly refined ingots are used, results are at least equal and often superior."

Possibilities for increased use of bronze bearings on machine tools designed for tungsten carbide cutting tools are seen by N. K. B. Patch, secretary, Lumen Bearing Co., Buffalo. The silent feature of bronze gears together with their good wearing qualities also impress Mr. Patch as factors influencing the nonferrous castings industry.

Progress evidenced by the manufacture and use of die castings is summed up by Charles Pack, consulting engineer, New York.

"The use of die castings has increased to a marked extent during the year 1929. During the first nine months of this year, the facilities of every reliable die casting plant were taxed to their limits and many were engaged in increasing the size of plants and adding to equipment.

"At present, zinc is the lowest priced commercial metal in the nonferrous group. Recent developments in alloy practice make it possible to produce zinc base alloys havng a tensile strength of from 40,000 to 50,000 pounds per square inch, the strength of a good brass or malleable iron. Recent developments in automatic die casting equipment make it possible to produce accurately finished die castings from these alloys at an approximate cost of 12 cents per pound and under. It is evident therefore that finished, highly accurate die castings can now be produced at a cost that is lower than the basic cost of the raw alloy used in any other metalworking industry, with the exception of iron and steel.

"Little progress has been made during the past year in the matter of die casting yellow brass in this country. A number of machines have been developed, however, the results obtained being sufficiently favorable to warrant the prediction that a number of brass die casting machines will be placed on the market in the near future."

Industry Is Demanding Superior Refractories

(*Concluded from Page* 31)

during the past year has been of primary importance. Substantial progress has been made all along the line, but there has been no single development of a sensational nature, such as the cast tank block of a few years ago," declares M. E. Holmes, professor of ceramic engineering, school of mines and metallurgy, University of Missouri, Rolla, Mo.

An investigation, regarding the effect on brick production of the adoption of a 3-inch brick as standard, performed by C. E. Bales, Ironton Fire Brick Co., Ironton, O., revealed the following advantages for the 3-inch brick: Greater production from the dies; better wages for molders; less breakage in manufacturing; less warpage; less kiln marking; quicker installation; fewer joints; and better agreement with other sizes.

Among newer types of refractories which have been compounded are several types of high temperature insulation; an insulator which is at the same time a refractory, a product already on the market; and a new silica refractory with a base of Sharon conglomerate, having a silica content ranging from 93 to 98 per cent. The latter is manufactured by the Portsmouth Refractories Co., Portsmouth, O. The material is reported to have produced interesting results in use in the acid open hearth and is said to have a negligible factor of spalling; low heat conductivity; nonfluxibility with the bath of metal; and increased load bearing ability.

Extend Applications of Welding, Riveting

(*Concluded from Page* 27)

1929 had increased materially. The new-type "battle-deck floor introduced by the American Institute of Steel Construction was a highly important contribution to the welding industry because a special automatic arc welding machine is used to stitch together the plates and beams forming the floor. The machine is a product of the General Electric Co. Mr. Thurston also comments upon the increased use of arc welding in building oil and gas pipe lines.

M. L. Eckman, general manager, Taylor-Winfield Corp., Warren, O., notes the tendency of all manufacturers whose product is fabricated from iron and steel to follow the lead of the automotive industry in applying electrical resistance welding to increase the quality and speed of their production. He says:

"There is no competition between arc welding and resistance welding or between resistance welding and acetylene welding; each is a helper of the other. Where more arc welding will be used more acetylene also is likely to be used and more resistance welding is the natural outcome of any type of welding.

"The nonferrous metal trade is turning rapidly to welding to help solve some of its problems. Many companies are welding brass, copper, aluminum and the alloyed metals by the resistance process."

Speaking for interests concerned with fabricating by riveting, A. F. Jensen, president, Hanna Engineering Works, Chicago, states:

"The quality of the riveted joint is better than that of a decade ago, shop methods of the past having been superseded by an exactness almost equal to that of the machine shop. The effort to improve the quality of the riveted joint keeps in step with the introduction of equipment to reduce labor costs.

"The outstanding development during the year was undoubtedly the riveting of the gas-tight sheathing of the all-metal dirigible ZMC-2. Some 3,500,000 rivets 0.035-inch diameter were driven by a single riveter at the rate of about 5000 rivets per hour. In its operation three strands of wire are fed into the riveter like thread in the sewing machine. The overlap of the sheathing is ½-inch in which are driven three rows of rivets 12 to the inch.

"A review of the present state of knowledge of riveted joints is now in progress and will be of material assistance in determining the lines along which research should be conducted. The promise for economies by cold riveting would in itself justify the research."

Composite Market Record

Compiled by Iron Trade Review

Monthly Averages of Fourteen Iron and Steel Products, 1918-1925

1918	
January	$56.67
February	56.67
March	56.71
April	56.59
May	56.59
June	56.62
July	56.66
August	56.67
September	56.56
October	57.53
November	55.67
December	57.24
Average for year	56.68

1919	
January	53.81
February	53.71
March	52.28
April	48.45
May	48.29
June	47.88
July	47.86
August	$48.27
September	48.35
October	48.76
November	51.28
December	54.88
Average for year	50.32

1920	
January	59.40
February	65.63
March	65.47
April	67.49
May	68.26
June	67.89
July	68.29
August	68.93
September	69.28
October	68.61
November	63.75
December	54.04
Average for year	65.59

1921	
January	51.98
February	$48.81
March	45.37
April	43.84
May	43.32
June	41.87
July	38.14
August	35.99
September	35.34
October	35.46
November	34.71
December	33.99
Average for year	40.74

1922	
January	33.35
February	32.86
March	32.97
April	34.42
May	36.49
June	36.96
July	37.50
August	39.79
September	43.79
October	43.60
November	$42.08
December	40.53
Average for year	38.76

1923	
January	41.17
February	42.61
March	45.31
April	47.01
May	47.52
June	46.46
July	45.39
August	44.87
September	44.64
October	43.84
November	42.81
December	43.02
Average for year	44.55

1924	
January	43.26
February	43.49
March	43.24
April	42.33
May	$41.38
June	40.61
July	39.78
August	39.33
September	39.05
October	38.65
November	39.00
December	40.21
Average for year	40.86

1925	
January	41.02
February	41.13
March	40.70
April	39.45
May	38.37
June	37.60
July	37.45
August	37.39
September	37.35
October	37.61
November	38.73
December	39.14
Average for year	38.83

Weekly and Monthly Averages, 1926-1929

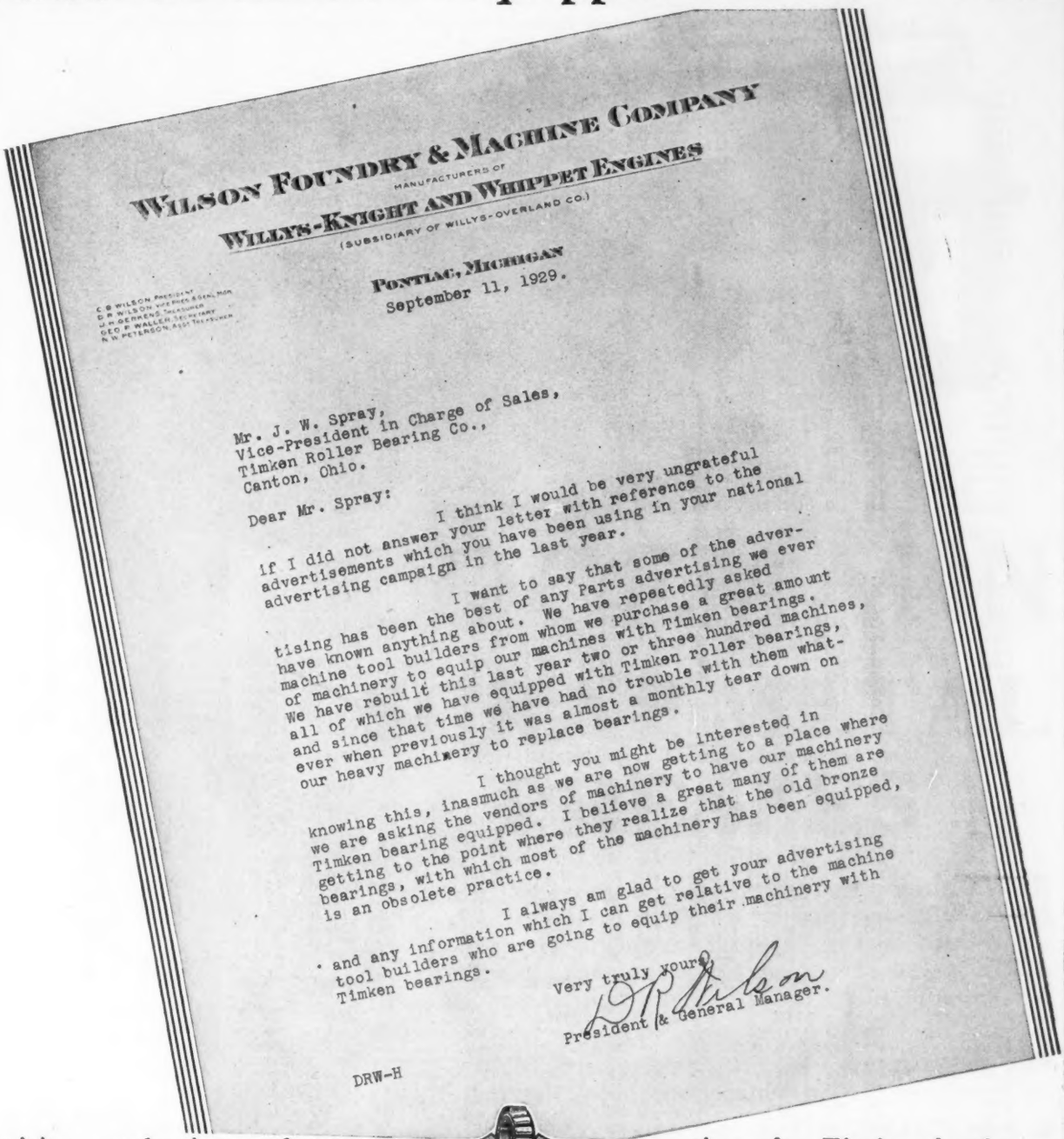
1926	
Jan. 6	$39.26
Jan. 13	39.26
Jan. 20	39.15
Jan. 27	39.01
Average for January	39.17
Feb. 3	39.00
Feb. 10	38.98
Feb. 17	38.90
Feb. 24	38.90
Average for Feb.	38.95
Mar. 3	38.90
Mar. 10	38.90
Mar. 17	38.85
Mar. 24	38.89
Mar. 31	38.86
Average for March	38.88
April 7	38.54
April 14	38.53
April 21	38.47
April 28	38.39
Average for April	38.48
May 5	38.39
May 12	38.34
May 19	38.14
May 26	38.00
Average for May	38.22
June 2	37.84
June 9	37.68
June 16	37.60
June 23	37.58
June 30	37.74
Average for June	37.69
July 7	37.74
July 14	37.69
July 21	37.67
July 28	37.61
Average for July	37.68
Aug. 4	37.61
Aug. 11	37.61
Aug. 18	37.61
Aug. 25	37.61
Average for August	37.61
Sept. 1	37.58
Sept. 8	37.76
Sept. 15	37.78
Sept. 22	37.86
Sept. 29	37.82
Average for September	37.76
Oct. 6	37.85
Oct. 13	38.13
Oct. 20	38.14
Oct. 27	38.18
Average for October	38.08
Nov. 3	38.30
Nov. 10	38.43
Nov. 17	38.47
Nov. 24	38.50
Average for November	38.43
Dec. 1	38.46
Dec. 8	38.24
Dec. 15	38.22
Dec. 22	38.12
Dec. 29	38.08
Average for December	38.22

1927	
Jan. 5	$38.06
Jan. 12	37.78
Jan. 19	37.47
Jan. 26	37.38
Average for January	37.68
Feb. 2	37.32
Feb. 9	37.06
Feb. 16	36.75
Feb. 23	36.75
Average for February	36.97
Mar. 2	36.75
Mar. 9	36.79
Mar. 16	36.87
Mar. 23	36.87
Mar. 30	36.89
Average for March	36.83
April 6	36.81
April 13	36.81
April 20	36.64
April 27	36.64
Average for April	36.73
May 4	36.70
May 11	36.85
May 18	36.82
May 25	36.66
Average for May	36.76
June 1	36.40
June 8	36.72
June 15	36.70
June 22	36.65
June 29	36.50
Average for June	36.59
July 6	36.49
July 13	36.38
July 20	36.40
July 27	36.36
Average for July	36.41
Aug. 3	36.26
Aug. 10	36.24
Aug. 17	36.23
Aug. 24	36.23
Aug. 31	36.27
Average for August	36.25
Sept. 7	36.27
Sept. 14	36.25
Sept. 21	36.10
Sept. 28	36.09
Average for September	36.18
Oct. 5	36.05
Oct. 12	35.55
Oct. 19	35.55
Oct. 26	35.51
Average for October	35.67
Nov. 2	35.51
Nov. 9	35.45
Nov. 16	35.36
Nov. 23	35.24
Nov. 30	35.17
Average for November	35.35
Dec. 7	35.10
Dec. 14	35.09
Dec. 21	35.09
Dec. 28	35.07
Average for December	35.09

1928	
Jan. 4	$35.07
Jan. 11	35.23
Jan. 18	35.33
Jan. 25	35.45
Average for January	35.27
Feb. 1	35.45
Feb. 8	35.61
Feb. 15	35.61
Feb. 22	35.61
Feb. 29	35.83
Average for February	35.62
Mar. 7	35.91
Mar. 14	35.91
Mar. 21	35.70
Mar. 28	35.71
Average for March	35.81
April 4	35.77
April 11	35.77
April 18	35.56
April 25	35.56
Average for April	35.67
May 2	35.56
May 9	35.57
May 16	35.53
May 23	35.53
May 30	35.50
Average for May	35.54
June 6	35.46
June 13	35.48
June 20	35.20
June 27	35.05
Average for June	35.30
July 4	34.93
July 11	34.85
July 18	34.89
July 25	34.97
Average for July	34.91
Aug. 1	34.93
Aug. 8	34.89
Aug. 15	34.89
Aug. 22	35.01
Aug. 29	35.10
Average for August	34.96
Sept. 5	35.11
Sept. 12	35.13
Sept. 19	35.23
Sept. 26	35.29
Average for September	35.19
Oct. 3	35.30
Oct. 10	35.42
Oct. 17	35.57
Oct. 24	35.63
Oct. 31	35.73
Average for October	35.53
Nov. 7	35.81
Nov. 14	35.93
Nov. 21	36.19
Nov. 28	36.13
Average for November	36.02
Dec. 5	36.16
Dec. 12	36.24
Dec. 19	36.24
Dec. 26	36.24
Average for December	36.22

1929	
Jan. 2	$36.25
Jan. 9	36.23
Jan. 16	36.23
Jan. 23	36.25
Jan. 30	36.25
Average for January	36.24
Feb. 6	36.25
Feb. 13	36.25
Feb. 20	36.25
Feb. 27	36.37
Average for February	36.28
Mar. 6	36.37
Mar. 13	36.37
Mar. 20	36.37
Mar. 27	36.57
Average for March	36.42
Apr. 3	36.57
Apr. 10	36.81
Apr. 17	36.82
Apr. 24	37.04
Average for April	36.81
May 1	37.07
May 8	37.07
May 15	37.13
May 22	37.13
May 29	37.10
Average for May	37.10
June 5	37.07
June 12	37.07
June 19	36.96
June 26	36.84
Average for June	36.99
July 3	36.76
July 10	36.72
July 17	36.72
July 24	36.68
July 31	36.68
Average for July	36.71
Aug. 7	36.60
Aug. 14	36.52
Aug. 21	36.52
Aug. 28	36.52
Average for August	36.54
Sept. 4	36.52
Sept. 11	36.52
Sept. 18	36.52
Sept. 25	36.44
Average for September	36.50
Oct. 2	36.36
Oct. 9	36.32
Oct. 16	36.24
Oct. 23	36.16
Oct. 30	36.09
Average for October	36.23
Nov. 6	36.09
Nov. 13	36.09
Nov. 20	35.97
Nov. 27	35.97
Average for November	36.03
Dec. 4	35.97
Dec. 11	35.95
Dec. 18	35.97
Dec. 25	35.89
Average for December	35.95

Builders Of Willys-Knight Engines Stress The Value Of Timken-Equipped Machine Tools



WILSON FOUNDRY & MACHINE COMPANY
MANUFACTURERS OF
WILLYS-KNIGHT AND WHIPPET ENGINES
(SUBSIDIARY OF WILLYS-OVERLAND CO.)

PONTIAC, MICHIGAN
September 11, 1929.

C. R. WILSON, PRESIDENT
D. R. WILSON, VICE-PRES. & GEN. MGR.
H. H. GERKENS, TREASURER
GEO. P. WALLER, SECRETARY
N. W. PETERSON, ASST. TREASURER

Mr. J. W. Spray,
Vice-President in Charge of Sales,
Timken Roller Bearing Co.,
Canton, Ohio.

Dear Mr. Spray:

I think I would be very ungrateful if I did not answer your letter with reference to the advertisements which you have been using in your national advertising campaign in the last year.

I want to say that some of the advertising has been the best of any Parts advertising we ever have known anything about. We have repeatedly asked machine tool builders from whom we purchase a great amount of machinery to equip our machines with Timken bearings. We have rebuilt this last year two or three hundred machines, all of which we have equipped with Timken roller bearings, and since that time we have had no trouble with them whatever when previously it was almost a monthly tear down on our heavy machinery to replace bearings.

I thought you might be interested in knowing this, inasmuch as we are now getting to a place where we are asking the vendors of machinery to have our machinery Timken bearing equipped. I believe a great many of them are getting to the point where they realize that the old bronze bearings, with which most of the machinery has been equipped, is an obsolete practice.

I always am glad to get your advertising and any information which I can get relative to the machine tool builders who are going to equip their machinery with Timken bearings.

Very truly yours,
C. R. Wilson
President & General Manager.

DRW-H

Precision, production, endurance and economy are assured when machine tool spindles, gear boxes, feed mechanisms and other heavy duty points are Timken Bearing Equipped.

This is the experience of users of Timken-equipped machine tools throughout the nation—for Timken is *the one bearing that does all things well,* whether the loads are all *radial,* all *thrust or a combination of both*—through the exclusive combination of Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS* and Timken steel.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

Pig Iron Production

IN GROSS TONS

Annual Statistics of Coke and Anthracite Pig Iron Compiled by American Iron and Steel Institute, Monthly Statistics, 1909 to date, by IRON TRADE REVIEW

1856....	457,738	1869....	1,361,153	1882....	4,000,193	1895....	9,220,967					
1857....	417,711	1870....	1,339,284	1883....	4,085,041	1896....	8,311,833					
1858....	374,804	1871....	1,363,043	1884....	3,670,567	1897....	9,397,469					
1859....	496,952	1872....	2,101,760	1885....	3,687,522	1898....	11,477,184					
1860....	572,713	1873....	2,045,231	1886....	5,273,010	1899....	13,335,937					
1861....	478,809	1874....	1,886,479	1887....	5,900,914	1900....	13,404,760					
1862....	536,609	1875....	1,656,777	1888....	5,955,105	1901....	15,494,913					
1863....	656,785	1876....	1,593,382	1889....	7,028,374	1902....	17,431,138					
1864....	798,342	1877....	1,782,805	1890....	8,574,558	1903....	17,503,568					
1865....	597,536	1878....	2,039,252	1891....	7,702,906	1904....	16,157,504					
1866....	918,717	1879....	2,151,431	1892....	8,619,379	1905....	22,639,452					
1867....	997,576	1880....	3,355,228	1893....	6,737,713	1906....	24,874,184					
1868....	1,100,893	1881....	3,573,863	1894....	6,434,966	1907....	25,343,964					
						1908....	15,718,579					

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1909	
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	*69,383

	—Stacks— No.	In	——Output—— Total	Av. Daily	—Stacks— No.	In	——Output—— Total	Av. Daily	—Stacks— No.	In	——Output—— Total	Av. Daily	—Stacks— No.	In	——Output—— Total	Av Daily
			1910				**1911**				**1912**				**1913**	
January	416	311	2,599,995	83,871	421	210	1,766,658	56,985	421	227	2,052,806	66,220	423	297	2,787,800	89.929
February	417	311	2,429,525	86,768	421	226	1,781,285	63,617	422	235	2,098,796	72,372	423	306	2,578,670	92,095
March	417	310	2,588,736	83,508	421	236	2,165,764	69,863	420	237	2,411,529	77,791	423	278	2,762,823	89,123
April	418	291	2,477,700	82,590	421	220	2,044,904	68,163	421	239	2,377,621	79,254	421	297	2,754,353	91,812
May	419	279	2,374,802	76,607	421	206	1,871,388	60,367	423	243	2,503,341	80,753	421	285	2,816,825	90,865
June	420	271	2,288,279	76,276	421	202	1,773,282	59,109	424	242	2,433,737	81,125	422	283	2,616,883	87,229
July	420	254	2,158,124	69,617	423	196	1,776,108	57,294	422	245	2,402,567	77,502	422	264	2,558,275	82,525
August	422	244	2,103,791	67,864	423	206	1,921,832	61,995	423	255	2,500,163	80,650	424	260	2,537,018	81,839
September	420	234	2,048,461	68,282	423	216	1,973,918	65,797	419	262	2,444,454	81,482	425	258	2,494,098	83,137
October	421	230	2,086,205	67,297	421	214	2,092,061	67,486	422	280	2,683,645	86,569	425	244	2,539,924	81,933
November	421	218	1,910,385	63,679	421	214	1,999,100	66,637	423	289	2,639,562	87,985	424	225	2,229,960	74,322
December	421	193	1,779,899	57,416	422	215	2,032,301	65,558	423	291	2,777,292	89,590	424	191	1,976,138	63,746
Total			26,845,902	*73,550			23,198,601	*63,558			29,325,513	*80,124			30,652,767	*83,980
			1914				**1915**				**1916**				**1917**	
January	423	199	1,879,336	60,624	421	165	1,591,024	51,323	421	304	3,171,878	102,319	422	310	3,159,839	101,930
February	423	219	1,888,607	67,450	421	179	1,666,592	59,521	421	312	3,078,548	106,157	422	317	2,649,935	94,641
March	423	232	2,341,551	75,534	421	190	2,046,280	66,009	422	315	3,327,630	107,343	423	331	3,255,813	105,026
April	422	212	2,261,501	75,383	421	197	2,114,518	70,484	422	320	3,225,496	107,517	425	333	3,328,061	110,936
May	422	198	2,097,019	67,646	421	207	2,255,157	72,747	423	321	3,364,584	108,535	425	340	3,413,677	110,119
June	422	193	1,904,566	63,486	421	221	2,369,932	78,998	423	325	3,213,818	107,127	427	347	3,260,234	108,675
July	422	187	1,955,324	63,075	421	234	2,563,311	82,687	419	316	3,221,127	103,907	429	351	3,337,442	107,659
August	422	187	1,996,483	64,403	421	246	2,774,825	89,510	419	317	3,197,838	103,156	431	357	3,238,970	104,483
September	422	180	1,882,718	62,757	420	266	2,834,342	94,478	419	326	3,208,041	106,935	431	342	3,140,742	104,691
October	422	162	1,767,227	57,007	420	276	3,120,340	100,656	419	328	3,508,180	113,167	433	354	3,296,286	106,332
November	421	150	1,501,269	50,042	421	285	3,035,235	101,174	420	322	3,317,805	110,593	434	344	3,198,597	106,620
December	421	154	1,495,325	48,236	421	295	3,201,605	103,278	422	309	3,184,178	102,715	435	321	2,885,380	93,077
Tot.			22,970,926	*62,934			29,573,161	*81,022			39,019,123	*106,609			38,164,976	*104,561
			1918				**1919**				**1920**				**1921**	
January	435	294	2,403,227	77,523	435	330	3,306,279	106,654	432	285	3,012,373	97,172	436	184	2,414,753	77,895
February	435	319	2,318,242	82,723	435	311	2,943,347	105,120	432	305	2,984,257	102,904	436	155	1,929,394	68,906
March	438	338	3,209,996	103,548	435	279	3,088,023	99,614	433	315	3,375,768	108,895	436	103	1,594,866	51,447
April	437	351	3,273,355	109,112	435	216	2,474,374	82,479	433	278	2,752,670	91,754	436	96	1,190,751	39,691
May	437	360	3,451,884	111,351	433	197	2,107,729	67,991	433	297	2,991,825	96,510	436	90	1,215,272	39,202
June	437	353	3,316,148	110,538	433	199	2,114,028	70,467	433	302	3,046,623	101,553	436	74	1,064,007	35,466
July	437	364	3,408,584	109,954	434	240	2,424,212	78,200	434	291	3,043,918	98,190	435	69	864,642	27,892
August	438	371	3,378,479	108,983	432	266	2,742,081	88,453	434	306	3,145,536	101,468	436	69	954,901	30,802
September	438	364	3,413,223	113,774	433	163	2,480,790	82,692	434	317	3,124,308	104,143	435	84	985,795	32,859
October	437	364	3,482,392	112,335	432	216	1,864,424	60,142	435	290	3,288,341	106,075	435	95	1,234,450	39,821
November	437	360	3,347,844	111,595	432	252	2,407,369	80,244	435	255	2,935,081	97,836	429	120	1,414,958	47,165
December	435	351	3,434,114	110,778	432	262	2,626,074	84,711	435	202	2,700,268	87,105	429	123	1,642,775	52,992
Total			38,437,488	*105,308			30,578,730	*83,777			36,400,968	*99,456			16,506,564	*45,223
			1922				**1923**				**1924**				**1925**	
January	430	127	1,645,804	53,090	428	261	3,228,226	104,136	414	248	3,015,480	97,273	411	251	3,372,207	108,781
February	429	139	1,630,180	58,220	424	278	2,993,918	106,925	414	263	3,073,619	105,987	411	256	3,214,067	114,788
March	429	155	2,035,908	65,674	424	295	3,523,595	113,664	410	269	3,465,389	111,787	410	246	3,571,422	115,207
April	429	161	2,070,161	69,005	423	311	3,546,308	118,210	410	234	3,226,107	107,537	409	221	3,211,235	107,041
May	427	175	2,309,348	74,495	423	322	3,868,486	124,790	411	187	2,619,986	84,515	405	196	2,933,907	94,642
June	427	191	2,362,455	78,748	424	322	3,667,868	122,262	411	158	2,022,836	67,427	399	191	2,679,045	89,301
July	427	170	2,403,030	77,517	418	299	3,684,677	118,860	411	145	1,783,457	57,531	396	188	2,665,262	85,976
August	427	143	1,810,665	58,408	418	270	3,448,886	111,254	411	150	1,882,986	60,741	391	192	2,707,171	87,328
September	427	189	2,024,008	67,466	418	254	3,117,526	103,917	411	174	2,053,617	68,454	387	200	2,725,885	90,862
October	428	218	2,629,655	84,827	418	245	3,142,642	101,375	411	182	2,461,727	79,410	386	209	3,017,889	97,351
November	428	241	2,846,110	94,870	418	229	2,891,191	96,373	411	204	2,514,979	83,832	385	220	3,023,257	100,775
December	428	253	3,083,520	99,468	418	231	2,912,527	93,952	411	229	2,956,389	95,367	385	234	3,249,057	104,808
Total			26,850,844	*73,563			40,025,850	*109,659			31,076,572	*84,908			36,370,404	*99,645
			1926				**1927**				**1928**				**1929**	
January	385	225	3,319,789	107,089	369	210	3,101,346	100,043	353	184	2,855,515	92,113	328	202	3,433,028	110,742
February	382	223	2,923,850	104,423	369	217	2,940,604	105,021	353	186	2,898,668	99,954	326	208	3,218,376	114,942
March	377	235	3,458,171	111,554	365	223	3,482,107	112,326	350	197	3,199,175	103,199	326	213	3,709,518	119,662
April	376	237	3,438,805	114,627	364	221	3,424,377	114,146	349	195	3,181,975	106,066	326	216	3,663,167	122,106
May	376	229	3,477,820	112,187	363	211	3,391,067	109,388	345	199	3,292,790	106,219	325	220	3,898,344	125,753
June	372	220	3,232,478	107,749	362	198	3,089,726	102,991	343	189	3,082,340	102,745	325	220	3,715,104	123,837
July	372	217	3,224,663	104,021	362	190	2,954,625	95,311	342	185	3,072,711	99,120	325	217	3,782,511	122,016
August	372	215	3,200,723	103,249	362	189	2,950,674	95,183	340	183	3,136,995	101,193	325	209	3,746,198	120,845
September	372	216	3,163,269	105,442	362	181	2,782,500	92,750	340	194	3,063,593	102,120	323	204	3,496,454	116,548
October	374	218	3,334,206	107,555	361	174	2,812,015	90,712	338	196	3,373,539	108,824	318	203	3,588,146	115,747
November	375	216	3,237,992	107,933	359	171	2,661,863	88,728	337	194	3,304,656	110,155	317	176	3,182,420	106,081
December	369	203	3,089,175	99,651	354	169	2,698,208	87,039	335	198	3,369,784	108,702	...	...	.....	.....
Total			39,100,941	*107,126			36,289,112	*99,422			37,831,741	103,365			†39,433,266	*118,064

*Average.
†Eleven months.

Model 24-P ejection type press, having box 100" long, 20" wide, 42" deep. Finished bales measure 20" x 14" x 14" minimum. Can be equipped with power operated loading hopper

LOGEMANN SCRAP METAL PRESSES

Hydraulically compressed scrap commands at all times the *best price*, and can be conveniently stored and held for favorable markets; it is easily handled; it practically eliminates corrosion; it saves much time in remelting; cars can be easily loaded to capacity.

***LOGEMANN Presses* are built in several types and sizes to suit all requirements.**

You cannot go wrong on a LOGEMANN—it's a money maker from the day it is set in operation.

PIONEERS!

LOGEMANN Scrap Metal Presses, pioneers in this industry, enjoy an enviable reputation for long life and economical operation. They are in daily use in practically every large sheet mill, stamping plant, scrap yard, and in metal-working establishments of all kinds.

Our many years of accumulated experience, and services of our Engineering Department are at the disposal of all plants accumulating metal scrap of any kind.

LOGEMANN BROTHERS COMPANY, 3126 Burleigh St., MILWAUKEE, WIS.

Steel Ingot Production

Compiled by American Iron and Steel Institute

	1920		1921		1922		1923		1924	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	3,524,026	130,519	2,517,042	96,809	1,891,857	72,764	3,841,095	142,263	3,649,913	135,182
February	3,401,760	141,740	1,998,705	83,279	2,071,772	86,324	3,471,843	144,660	3,826,246	153,050
March	3,916,960	145,073	1,794,777	66,473	2,814,667	104,247	4,066,680	150,618	4,206,699	161,796
April	3,132,458	120,479	1,386,897	53,342	2,902,240	116,090	3,963,736	158,549	3,348,466	128,787
May	3,423,178	131,661	1,446,181	55,622	3,218,794	119,215	4,216,355	156,161	2,640,034	97,779
June	3,538,971	136,114	1,146,350	44,090	3,127,775	120,299	3,767,256	144,894	2,065,676	82,627
July	3,327,785	127,992	917,824	36,713	2,952,806	118,112	3,531,458	141,258	1,877,789	72,223
August	3,562,411	137,016	1,300,199	48,156	2,629,256	97,380	3,695,788	136,881	2,552,891	98,188
September	3,561,365	136,976	1,342,092	51,619	2,818,261	108,395	3,356,776	134,271	2,827,625	108,755
October	3,580,873	137,726	1,847,139	71,044	3,410,265	131,164	3,577,091	132,485	3,125,418	115,756
November	3,132,891	120,496	1,896,483	72,942	3,430,309	131,935	3,134,321	120,551	3,121,149	124,846
December	2,778,714	106,874	1,630,395	62,707	3,300,416	132,017	2,863,266	114,531	3,569,251	137,279
Total	40,881,392	*131,030	19,224,084	*61,814	34,568,418	*111,511	43,485,665	*139,825	36,811,157	*117,984

	1925		1926		†1927		†1928		†1929	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	4,193,281	155,307	4,132,210	158,931	3,789,874	145,764	3,990,902	153,496	4,490,354	166,309
February	3,752,352	156,348	3,785,051	157,710	3,812,046	158,835	4,043,457	161,738	4,326,000	180,250
March	4,194,340	161,321	4,468,617	165,504	4,535,272	167,973	4,507,217	166,934	5,058,258	194,548
April	3,583,676	137,834	4,105,799	157,915	4,127,335	158,744	4,305,382	172,215	4,938,025	189,924
May	3,454,971	132,883	3,927,979	151,076	4,047,251	155,663	4,207,212	155,823	5,273,167	195,302
June	3,204,451	123,248	3,734,153	143,621	3,495,609	134,446	3,743,903	143,996	4,881,370	195,255
July	3,084,472	118,634	3,634,993	139,807	3,204,135	128,165	3,805,598	152,224	4,838,093	186,080
August	3,420,998	131,577	3,986,966	153,345	3,498,549	129,576	4,178,610	154,763	4,927,258	182,491
September	3,489,565	134,214	6,913,383	150,515	3,268,881	125,726	4,147,893	165,916	4,510,879	180,435
October	3,888,814	144,030	4,074,544	156,713	3,316,292	127,550	4,649,968	172,221	4,511,650	167,098
November	3,902,900	156,116	3,705,744	142,529	3,127,015	120,270	4,266,835	164,109	3,513,025	135,116
December	3,970,918	152,728	3,466,766	133,337	3,175,484	122,134	4,018,208	160,728	.....	.....
Total	44,140,738	*141,932	46,936,205	*150,920	43,397,743	*139,543	49,865,185	160,338	‡51,268,079	*179,259

*Average. †Beginning with 1927, the Institute excludes crucible and electric ingots which will total approximately 124,000 tons for the year. ‡Eleven months.

Statistics of Consumption

FREIGHT CAR ORDERS

Compiled by IRON TRADE REVIEW

Month	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	2,500	21,700	15,000	200	3,180	4,500	1,700	11,000	15,000	8,150	1,695	8,830	14,710	4,160	13,196
February	4,000	12,900	7,750	4,575	60	7,000	200	14,500	9,300	41,350	5,510	12,895	5,960	10,220	15,944
March	1,100	8,750	21,500	2,190	150	5,500	1,400	12,000	42,500	13,150	4,730	8,895	4,955	2,958	12,023
April	1,500	7,000	4,250	31,150	575	20,500	350	31,500	9,800	10,250	5,060	4,615	3,675	6,043	8,205
May	18,000	4,500	15,000	70,165	360	8,000	250	18,250	2,200	511	6,985	4,448	5,425	2,531	7,562
June	17,000	5,100	8,200	400	1,010	5,500	1,500	13,100	1,785	438	1,835	4,285	7,440	2,422	5,886
July	9,500	2,600	8,650	30,000	2,510	7,000	900	13,700	1,450	886	800	1,265	2,295	582	341
August	3,000	15,025	13,000	10,000	2,125	7,000	150	1,610	2,780	5,980	2,875	152	1,181	677	2,854
September	9,000	14,500	1,100	4,000	3,975	3,500	550	10,350	897	27,630	7,905	3,335	682	1,378	4,517
October	22,500	26,000	42,800	40,900	4,750	6,500	6,500	12,700	1,125	5,885	11,145	2,840	886	2,853	19,506
November	11,500	37,000	10,000	200	350	2,500	7,000	18,500	5,050	12,720	11,685	3,925	1,189	6,140	6,361
December	10,400	19,600	1,000	8,000	1,000	2,500	550	23,255	11,600	18,475	16,885	8,990	14,897	4,799	.....
Total	110,000	174,675	148,250	201,780	20,045	80,000	22,050	180,465	103,487	144,425	77,110	64,475	63,295	44,763	*96,395

*Eleven months.

AUTOMOBILE PRODUCTION

Passenger Cars and Trucks, in United States

Compiled by Department of Commerce

Month	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	.....	89,374	244,302	318,526	240,592	309,544	238,927	231,728	401,037
February	.....	117,871	277,601	370,319	283,577	364,180	304,763	323,796	466,353
March	.....	171,487	358,779	382,718	374,425	434,470	394,443	413,314	585,223
April	.....	219,394	377,936	375,858	433,783	441,307	404,759	410,104	621,347
May	.....	255,622	393,826	314,105	419,267	421,184	404,115	425,783	604,084
June	.....	278,876	378,558	251,775	398,490	387,900	321,967	396,796	545,356
July	176,870	245,755	330,039	270,312	397,753	359,275	268,485	392,086	500,392
August	181,270	270,838	346,843	284,649	260,590	426,606	308,826	461,298	498,375
September	158,760	203,927	327,892	296,333	325,847	395,687	260,387	415,314	415,697
October	148,009	232,824	365,451	294,643	442,114	334,421	219,719	397,284	380,011
November	116,644	232,923	313,597	234,615	372,498	256,301	134,416	257,140	217,441
December	79,455	225,285	305,431	207,065	316,768	167,924	133,579	234,116	.....
Total	861,008	2,544,176	4,020,255	3,600,918	4,265,704	4,298,799	3,394,386	4,358,759	*5,235,316

*Eleven months.

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IRON TRADE REVIEW

Cleveland, O.
Jan. 9, 1930

Reports Show How Railroads Lead in Steel Consumption

Returns from 106 Steel Producers, Allocating Distribution of 36,157,095 Tons, Indicate Clearly How Railroads' Gains in 1929 Outstripped Those of Automotive Industry

EXAMINATION of the mass of detailed reports, from which IRON TRADE REVIEW'S annual analysis of finished rolled steel consumption is compiled, shows with convincing clarity that the railroads in 1929 regained their position as the best customer of the steel industry in point of tonnage consumed. The primary figures, as reported to IRON TRADE REVIEW by 106 steel producers, reveal—even more strikingly than the computed totals published on pages 37 to 40 of last week's issue — the consistent and well-defined manner in which railroad consumption of steel products in 1929 exceeded that by the automotive industry. The most noticeable feature in the company reports is the contrast in the degree of consistency of the business placed with steel producers by the railroads and by the automotive industry. With few exceptions, every steel producer who furnished several thousand tons or more of steel to the railroads in 1928, shipped a greater tonnage to them in 1929. On

Comparison of Steel Consumption, 1928 and 1929

	RAILROADS				AUTOMOTIVE INDUSTRY			
	Actually 1928	Reported 1929	Computed 1928	Total 1929	Actually 1928	Reported 1929	Computed 1928	Total 1929
Heavy Rails	2,184,714	2,370,589	2,453,433	2,557,865	77	656	84	709
Light Rails	1,653	4,108	1,855	4,433	4	68	4	73
Track accessories	848,863	959,600	953,272	1,035,408	101	79	111	85
Plates	770,125	1,197,426	864,281	1,292,023	194,852	256,394	216,285	277,264
Structural shapes	494,936	724,998	555,419	781,283	29,027	18,691	32,219	20,212
Bars and shapes under 3-inch, excepting concrete bars	561,897	594,242	630,559	641,187	1,941,072	2,482,982	2,182,823	2,685,097
Concrete bars	28,284	55,271	31,735	59,637	.....	.....	.....	.....
Hoops, bands, etc.	10,119	32,463	11,354	35,027	463,638	453,237	520,665	490,030
Black sheets for tinning	2	3	3	3	27,205	15,819	30,197	17,107
All other black plates and sheets, excepting galvanized sheets	181,216	205,304	203,324	221,523	1,657,940	1,608,807	1,861,866	1,739,764
Galvanized sheets	55,274	108,273	62,017	116,827	7,658	28,176	8,490	30,470
Tubing and pipe	37,778	67,417	42,387	72,743	73,689	86,320	81,794	93,346
Wire products	45,194	64,842	50,708	69,965	191,753	178,845	213,818	193,403
Strip steel	18,698	12,106	20,979	13,062	989,690	1,180,663	1,111,421	1,276,769
All other finished steel products	165,348	284,920	185,487	309,644	63,803	42,019	70,811	46,103
Totals	5,404,101	6,681,562	6,066,813	7,210,630	5,640,509	6,352,756	6,330,588	6,870,432

Analysis of Railroad Consumption

COMPUTED TOTALS, GROSS TONS

	1928	1929	Change
Heavy rails	2,453,433	2,557,865	104,432+
Light rails	1,855	4,433	2,578+
Track accessories	953,272	1,035,408	82,136+
Plates	864,281	1,292,023	427,742+
Structural shapes	555,419	781,283	225,864+
Bars, except concrete	630,559	641,187	10,628+
Concrete bars	31,735	59,637	27,902+
Hoops, bands, etc.	11,354	35,027	23,673+
Sheets, except galvanized	203,327	221,526	18,199+
Galvanized sheets	62,017	116,827	54,810+
Tubes and pipe	42,387	72,743	30,356+
Wire products	50,708	69,965	19,257+
Strip steel	20,979	13,062*	7,917—
All other finished products	185,487	309,644	124,157+
Totals	6,066,813	7,210,630	1,143,817+

the other hand, of 40 important producers who supplied large tonnages of steel to the automotive industry in 1928, only 20 increased their shipments in 1929, 18 furnished less steel than in the year before, and two held their position unchanged.

This shows that the gain of 1,143,817 tons of steel used by the railroads in 1929 as compared with their 1928 consumption, was distributed consistently to all producers who had participated in the business of the previous year. However, while the automotive industry used 539,844 tons more steel in 1929 than in 1928, this increase benefited only half of the producers serving the industry. As a matter of fact, several important producers who have specialized on steel for automobile use, shipped considerably less steel to the automotive industry in 1929 than in the previous year.

Gain By Products Consistent

The balanced gains of the railroads also appear impressive in the analysis of consumption by products. It will be noted in the table appearing at the top of this page that the railroads in 1929 consumed a greater tonnage of every rolled steel item except strip steel. In contrast to this, the automotive industry, as shown in the table at the bottom of the page, purchased more plates, bars, galvanized sheets, tubes and pipe and strip steel in 1929 than in 1928, but took less structural shapes, hoops and bands, black plates for tinning, other plates and sheets, and wire products.

The apparent inconsistency of automobile consumption, as reflected in purchases from individual producers of steel and in the consumption by products is due in a large measure to the character of automobile production in 1928 and 1929. It will be remembered that 1928 was an off-year for the Ford Motor Co. Of the 4,358,759 cars and trucks manufactured in the United States that year, only about 19 per cent, or 840,000 represented Ford output. In 1929, when the Ford plants were operating at a high rate, they turned out approximately 2,100,000 cars, or more than 39 per cent of the estimated total of 5,500,000 for the entire country.

This sharp fluctuation in Ford output was responsible for most of the marked shifts of business revealed in steel company reports. As a general statement it may be said that steel producers who served Ford in 1928 and 1929 showed large gains in tonnage shipped to the automotive industry in the latter year, while those who served General Motors and other manufacturers of higher priced cars, either lost tonnage or barely held their own. Ford influence explains why, in the face of an increase in automobile output of 1,000,000 cars, the industry did not outrank the railroads as the largest steel consumer. On the basis of computed figures, the automotive industry in 1928 took 2900 pounds of steel for every car it turned out. In 1929, the comparable figure was 2480 pounds per car. While there are numerous factors to cloud the significance of these averages, still they conform to what might be expected in view of the domination of heavier cars in 1928 and the preponderance of light units in 1929.

Roads Helped By Car Building

In examining steel consumption from the standpoint of known railroad purchases, the results of IRON TRADE REVIEW'S analysis appear most logical. In 1925, 1926, 1927 and 1928 the construction of freight cars dropped below 100,000 annually, whereas in 1922, 1923 and 1924 it had exceeded that figure by a comfortable margin. In every 100,000 car-year since IRON TRADE REVIEW'S consumption analysis was inaugurated, the railroads have taken about 25 per cent or more of the entire output of finished rolled steel. It is logical, therefore, that in 1929, when car building again mounted to above the 100,000 mark, railroad consumption rose sharply, aided of course by an increased use of rails and track material due to greater activity in the maintenance of way departments.

Possibility of a close race between the two leading consumers was predicted in an editorial in the Dec. 19 issue of IRON TRADE REVIEW, in which the relative significance of a million additional automobiles was contrasted with that of an estimated increase of 140 per cent in car buying and a 50 per cent gain in locomotive purchasing by the railroads of

Analysis of Automotive Consumption

COMPUTED TOTALS, GROSS TONS

	1928	1929	Change
Plates	216,285	277,264	60,979+
Structural shapes	32,219	20,212	12,007—
Bars, except concrete	2,182,823	2,685,097	502,274+
Hoops, bands, etc.	520,665	490,030	30,635—
Black sheets for tinning	30,197	17,107	13,090—
Other plates and sheets except galvanized	1,861,866	1,739,764	122,102—
Galvanized sheets	8,490	30,470	21,980+
Tubes and pipe	81,794	93,346	11,552+
Wire products	213,818	193,403	20,415—
Strip steel	1,111,421	1,276,769	165,384+
All other finished steel products	71,010	46,970	24,040—
Totals	6,330,588	6,870,432	539,844+

the country. Survey of consumption since 1922, when statistics were first available shows how easily the railroads can rise to a high point in the use of steel. The average weight of steel per car is greater now than ever before because of the practical elimination of wood except in a few types of cars. Heavier rails, now put down by the roads for main trackage, mean that for a given mileage of track relaid in 1929, considerably more tonnage is required than was needed 10 years ago.

Automobile Steel More Valuable

The railroads, therefore may be designated as the steel industry's best customer in 1929 in point of tonnage. However, there is another side to the picture, in which the automobile industry appears in a decidedly favorable light. This is in the value of steel consumed.

The railroads buy rails, track accessories and plates aggregating almost five million tons annually, while the automotive industry takes more than five million tons of bars, sheets and strip steel. The railroad steel is considerably cheaper than that used by the automobile builders.

Another sharp contrast in the requirements of the two consumers is reflected in their respective attitudes toward steel as a material of engineering construction. The railroads regard weight as an asset. Automotive engineers consider it a liability. Consequently we have seen few attempts in railroad design to minimize weight by the use of alloy steel, whereas in automobile and aircraft design we witness an intense effort to utilize high strength materials.

This difference in attitude will be reflected more and more as time goes on. Automotive engineers predict the car of the future will be lighter, and if this proves true, the consumption of steel per unit will be reduced.

Considering present consumption in the light of tendencies now apparent, we can summarize the situation by saying that the railroads are and will continue to be the most important consumer of tonnage. The positions of the roads and the automotive industry may be reversed at times, but the former will have the advantage the greater part of the time.

The automotive industry is and will continue to be the best customer of steel in point of value of purchases. It is the premier buyer of the more highly refined and finished materials.

Semifinished Tonnage Is Excluded

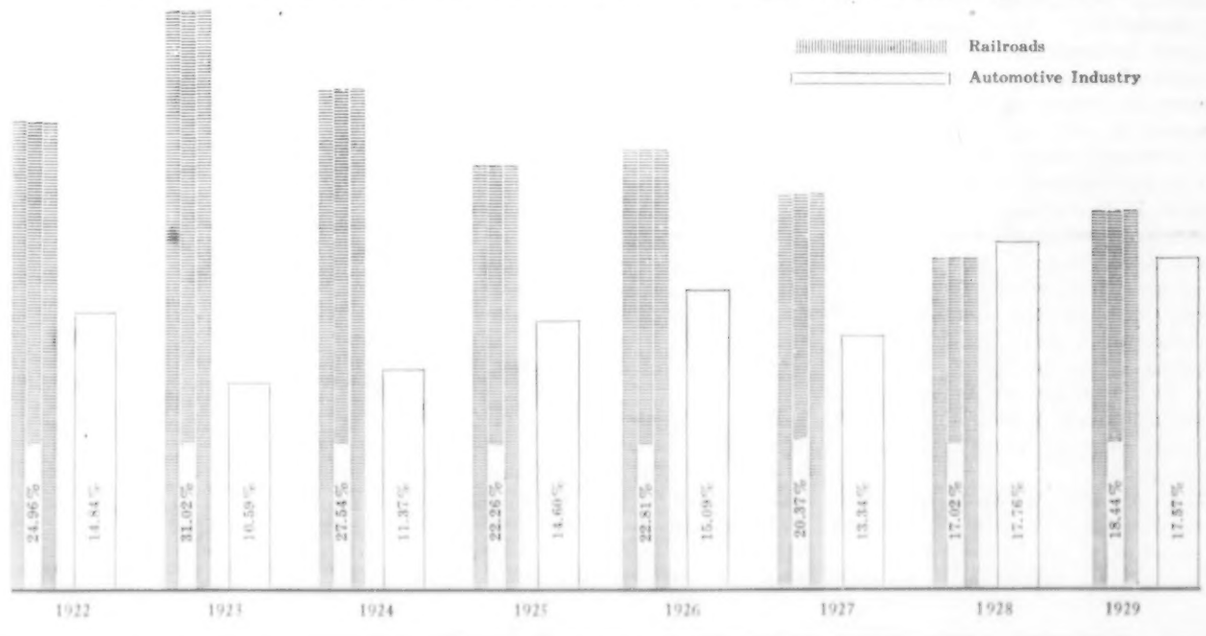
READERS of IRON TRADE REVIEW *again are reminded that its annual analysis of finished rolled steel consumption is based upon original reports on the* **destination of finished rolled iron and steel.** *No figures on semifinished steel are included. For this reason,* IRON TRADE REVIEW'S *computed total of* 39,103,200 *gross tons as the production of finished rolled iron and steel in* 1929, *as printed in the table "How Steel Ingots Shrink" on page* 36 *of the Annual issue, will not correspond with the total to be published in the "Annual Statistical Report for* 1929" *by the American Iron and Steel institute.*

This may be made clear by referring to 1928 *figures.* IRON TRADE REVIEW *showed* 35,645,201 *gross tons as the computed total of finished rolled iron and steel. The American Iron and Steel institute, on page* 38 *of its* 1929 *report, showed* 37,662,916 *as the total "production of all kinds of finished rolled iron and steel." However, the institute's figure includes wire rods, skelp, forging blooms and billets and perhaps other semifinished items which are subject to conversion losses.*

The experience of another year with IRON TRADE REVIEW'S *analysis, coupled with close checking with the institute's figures, may bring refinements which will lead to a formula by which the finished rolled steel can be determined with greater accuracy. In the meantime, it is evident the institute's figure is high and probable that* IRON TRADE REVIEW'S *is too conservative.*

THE EDITORS

Trend of Railroad and Automotive Consumption In Per Cent



Annual Statistics of Coke and Anthracite Pig Iron Compiled by American Iron and Steel Institute, Monthly Statistics, 1909 to date, by Iron Trade Review

1856....	457,738	1869....	1,361,153	1882....	4,000,193	1895....	9,220,967
1857....	417,711	1870....	1,339,284	1883....	4,085,041	1896....	8,311,833
1858....	374,804	1871....	1,363,043	1884....	3,670,567	1897....	9,397,469
1859....	496,952	1872....	2,101,760	1885....	3,687,522	1898....	11,477,184
1860....	572,713	1873....	2,045,231	1886....	5,273,010	1899....	13,335,937
1861....	478,809	1874....	1,886,479	1887....	5,900,914	1900....	13,404,769
1862....	536,609	1875....	1,656,777	1888....	5,955,105	1901....	15,494,913
1863....	656,785	1876....	1,593,382	1889....	7,028,374	1902....	17,431,138
1864....	798,242	1877....	1,762,593	1890....	9,274,556	1903....	17,903,568
1865....	597,536	1878....	2,039,252	1891....	7,702,906	1904....	16,157,504
1866....	918,717	1879....	2,151,431	1892....	8,619,379	1905....	22,639,452
1867....	997,576	1880....	3,355,228	1893....	6,737,713	1906....	24,874,184
1868....	1,100,893	1881....	3,573,863	1894....	6,434,966	1907....	25,343,964
						1908....	15,718,579

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1909	
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	414	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	*69,383

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1910	
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	*73,550

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1911	
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,388	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	*63,558

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1912	
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	*80,124

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1913	
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	*83,980

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1914	
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	*62,934

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1915	
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	*81,022

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1916	
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	*106,609

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1917	
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	*104,561

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1918	
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	438	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	*105,308

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1919	
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	*83,777

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1920	
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	*99,456

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1921	
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	*45,223

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1922	
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	*73,563

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1923	
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,546,308	118,210
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,642	101,375
November	418	229	2,891,191	96,373
December	418	231	2,912,527	93,952
Total			40,025,850	*109,659

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1924	
January	414	248	3,015,480	97,273
February	414	263	3,073,619	105,987
March	410	269	3,465,389	111,787
April	410	234	3,226,107	107,537
May	411	187	2,619,986	84,515
June	411	158	2,022,836	67,427
July	411	145	1,783,457	57,531
August	411	150	1,882,986	60,741
September	411	174	2,053,617	68,454
October	411	182	2,461,727	79,410
November	411	204	2,514,979	83,832
December	411	229	2,956,389	95,367
Total			31,076,572	*84,908

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1925	
January	411	251	3,372,207	108,781
February	411	256	3,214,067	114,788
March	410	246	3,571,422	115,207
April	409	221	3,211,235	107,041
May	405	196	2,933,907	94,642
June	399	191	2,679,045	89,301
July	396	188	2,665,262	85,976
August	391	192	2,707,171	87,328
September	387	200	2,725,885	90,862
October	386	209	3,017,889	97,351
November	385	220	3,023,257	100,775
December	385	234	3,249,057	104,808
Total			36,370,404	*99,645

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1926	
January	385	225	3,319,789	107,089
February	382	223	2,923,850	104,423
March	377	235	3,458,171	111,554
April	376	237	3,438,805	114,627
May	376	229	3,477,820	112,187
June	372	220	3,232,478	107,749
July	372	217	3,224,663	104,021
August	372	215	3,200,723	103,249
September	372	216	3,163,269	105,442
October	374	218	3,334,206	107,555
November	375	216	3,237,992	107,933
December	369	203	3,089,175	99,651
Total			39,100,941	*107,126

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1927	
January	369	210	3,101,346	100,043
February	369	217	2,940,604	105,021
March	365	223	3,482,107	112,326
April	364	221	3,424,377	114,146
May	363	211	3,391,067	109,388
June	362	198	3,089,726	102,991
July	362	190	2,954,625	95,311
August	362	189	2,950,674	95,183
September	362	181	2,782,500	92,750
October	361	174	2,812,015	90,712
November	359	171	2,661,863	88,728
December	354	169	2,698,208	87,039
Total			36,289,112	*99,422

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1928	
January	353	184	2,855,515	92,113
February	353	186	2,898,668	99,954
March	350	197	3,199,175	103,199
April	349	195	3,181,975	106,066
May	345	199	3,292,790	106,219
June	343	189	3,082,340	102,745
July	342	185	3,072,711	99,120
August	340	183	3,136,995	101,193
September	340	194	3,063,593	102,120
October	338	196	3,373,539	108,824
November	337	194	3,304,656	110,155
December	335	198	3,369,784	108,702
Total			37,831,741	103,365

	—Stacks— No.	In	——Output—— Total	Av. Daily
			1929	
January	328	202	3,433,028	110,742
February	326	208	3,218,376	114,942
March	326	213	3,709,518	119,662
April	326	216	3,663,167	122,106
May	325	220	3,898,344	125,753
June	325	220	3,715,104	123,837
July	325	217	3,782,511	122,016
August	325	209	3,746,198	120,845
September	323	204	3,496,454	116,548
October	318	203	3,588,146	115,747
November	317	176	3,182,420	106,08[illegible]
December	...	...	.....	....
Total			†39,433,266	*1[illegible]

*Average.
†Eleven months.

LOGEMANN SCRAP METAL PRESSES

Hydraulically compressed scrap commands at all times the *best price,* and can be conveniently stored and held for favorable markets; it is easily handled; it practically eliminates corrosion; it saves much time in remelting; cars can be easily loaded to capacity.

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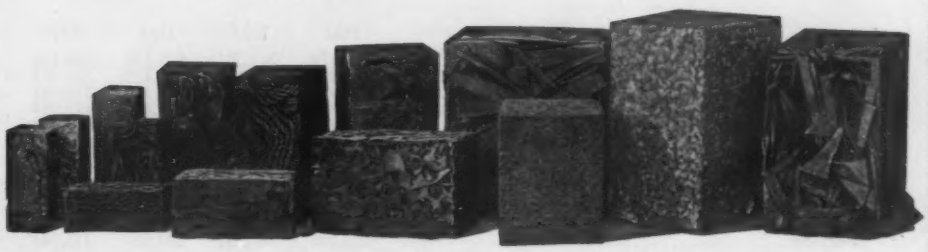

LOGEMANN BROTHERS COMPANY, 3126 Burleigh St., MILWAUKEE, WIS.

Steel Ingot Production

Compiled by American Iron and Steel Institute

	1920		1921		1922		1923		1924	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	3,524,026	130,519	2,517,042	96,809	1,891,857	72,764	3,841,095	142,263	3,649,913	135,182
February	3,401,760	141,740	1,998,705	83,279	2,071,772	86,324	3,471,843	144,660	3,826,246	153,050
March	3,916,960	145,073	1,794,777	66,473	2,814,667	104,247	4,066,680	150,618	4,206,699	161,796
April	3,132,458	120,479	1,386,897	53,342	2,902,240	116,090	3,963,736	158,549	3,348,466	128,787
May	3,423,178	131,661	1,446,181	55,622	3,218,794	119,215	4,216,355	156,161	2,640,034	97,779
June	3,538,971	136,114	1,146,350	44,090	3,127,775	120,299	3,767,256	144,894	2,065,676	82,627
July	3,327,785	127,992	917,824	36,713	2,952,806	118,112	3,531,458	141,258	1,877,789	72,223
August	3,562,411	137,016	1,300,199	48,156	2,629,256	97,380	3,695,788	136,881	2,552,891	98,188
September	3,561,365	136,976	1,342,092	51,619	2,818,261	108,395	3,356,776	134,271	2,827,625	108,755
October	3,580,873	137,726	1,847,139	71,044	3,410,265	131,164	3,577,091	132,485	3,125,418	115,756
November	3,132,891	120,496	1,896,483	72,942	3,430,309	131,935	3,134,321	120,551	3,121,149	124,846
December	2,778,714	106,874	1,630,395	62,707	3,300,416	132,017	2,863,266	114,531	3,569,251	137,279
Total	40,881,392	*131,030	19,224,084	*61,814	34,568,418	*111,511	43,485,665	*139,825	36,811,157	*117,984

	1925		1926		†1927		†1928		†1929	
	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.	Total	Daily Av.
January	4,193,281	155,307	4,132,210	158,931	3,789,874	145,764	3,990,902	153,496	4,490,354	166,309
February	3,752,352	156,348	3,785,051	157,710	3,812,046	158,835	4,043,457	161,738	4,326,000	180,250
March	4,194,340	161,321	4,468,617	165,504	4,535,272	167,973	4,507,217	166,934	5,058,258	194,548
April	3,583,676	137,834	4,105,799	157,915	4,127,335	158,744	4,305,382	172,215	4,938,025	189,924
May	3,454,971	132,883	3,927,979	151,076	4,047,251	155,663	4,207,212	155,823	5,273,167	195,302
June	3,204,451	123,248	3,734,153	143,621	3,495,609	134,446	3,743,903	143,996	4,881,370	195,255
July	3,084,472	118,634	3,634,993	139,807	3,204,135	128,165	3,805,598	152,224	4,838,093	186,080
August	3,420,998	131,577	3,986,966	153,345	3,498,549	129,576	4,178,610	154,763	4,927,258	182,491
September	3,489,565	134,214	6,913,383	150,515	3,268,881	125,726	4,147,893	165,916	4,510,879	180,435
October	3,888,814	144,030	4,074,544	156,713	3,316,292	127,550	4,649,968	172,221	4,511,650	167,098
November	3,902,900	156,116	3,705,744	142,529	3,127,015	120,270	4,266,835	164,109	3,513,025	135,116
December	3,970,918	152,728	3,466,766	133,337	3,175,484	122,134	4,018,208	160,728	.....	.....
Total	44,140,738	*141,932	46,936,205	*150,920	43,397,743	*139,543	49,865,185	160,338	‡51,268,079	*179,259

*Average. †Beginning with 1927, the Institute excludes crucible and electric ingots which will total approximately 124,000 tons for the year. ‡Eleven months.

Statistics of Consumption

FREIGHT CAR ORDERS

Compiled by IRON TRADE REVIEW

Month	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	2,500	21,700	15,000	200	3,180	4,500	1,700	11,000	15,000	8,150	1,695	8,830	14,710	4,160	13,196
February	4,000	12,900	7,750	4,575	60	7,000	200	14,500	9,300	41,350	5,510	12,895	5,960	10,220	15,944
March	1,100	8,750	21,500	2,190	150	5,500	1,400	12,000	42,500	13,150	4,730	8,895	4,955	2,958	12,023
April	1,500	7,000	4,250	31,150	575	20,500	350	31,500	9,800	10,250	5,060	4,615	3,675	6,043	8,205
May	18,000	4,500	15,000	70,165	360	8,000	250	18,250	2,200	511	6,985	4,448	5,425	2,531	7,562
June	17,000	5,100	8,200	400	1,010	5,500	1,500	13,100	1,785	438	1,835	4,285	7,440	2,422	5,886
July	9,500	2,600	8,650	30,000	2,510	7,000	900	13,700	1,450	886	800	1,265	2,295	582	341
August	3,000	15,025	13,000	10,000	2,125	7,000	150	1,610	2,780	5,980	2,875	152	1,181	677	2,854
September	9,000	14,500	1,100	4,000	3,975	3,500	550	10,350	897	27,630	7,905	3,335	682	1,378	4,517
October	22,500	26,000	42,800	40,900	4,750	6,500	6,500	12,700	1,125	5,885	11,145	2,840	886	2,853	19,506
November	11,500	37,000	10,000	200	350	2,500	7,000	18,500	5,050	12,720	11,685	3,925	1,189	6,140	6,361
December	10,400	19,600	1,000	8,000	1,000	2,500	550	23,255	11,600	18,475	16,885	8,990	14,897	4,799	.....
Total	110,000	174,675	148,250	201,780	20,045	80,000	22,050	180,465	103,487	144,425	77,110	64,475	63,295	44,763	*96,395

*Eleven months.

AUTOMOBILE PRODUCTION

Passenger Cars and Trucks, in United States

Compiled by Department of Commerce

Month	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	.....	89,374	244,302	318,526	240,592	309,544	238,927	231,728	401,037
February	.....	117,871	277,601	370,319	283,577	364,180	304,763	323,796	466,353
March	.....	171,487	358,779	382,718	374,425	434,470	394,443	413,314	585,223
April	.....	219,394	377,936	375,858	433,783	441,307	404,759	410,104	621,347
May	.....	255,622	393,826	314,105	419,267	421,184	404,115	425,783	604,084
June	.....	278,876	378,558	251,775	398,490	387,900	321,967	396,796	545,356
July	176,870	245,755	330,039	270,312	397,753	359,275	268,485	392,086	500,392
August	181,270	270,838	346,843	284,649	260,590	426,606	308,826	461,298	498,375
September	158,760	203,927	327,892	296,333	325,847	395,687	260,387	415,314	415,697
October	148,009	232,824	365,451	294,643	442,114	334,421	219,719	397,284	380,011
November	116,644	232,923	313,597	234,615	372,498	256,301	134,416	257,140	217,441
December	79,455	225,285	305,431	207,065	316,768	167,924	133,579	234,116	.....
Total	861,008	2,544,176	4,020,255	3,600,918	4,265,704	4,298,799	3,394,386	4,358,759	*5,235,316

*Eleven months.